AN HISTORICAL GEOGRAPHY OF FOREST POLICY AND MANAGEMENT

IN NEW ZEALAND, 1840-1930

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ABSTRACT

Forest policy and management progressed unsteadily in New Zealand throughout the nineteenth century until a fully autonomous State Forest Service was successfully established in 1921. The earliest efforts dating from the mid-nineteenth century involved the issue of timber licences to regulate the use of forest resources. Gradually, greater State involvement in both indigenous and exotic forestry developed. This occurred under adverse circumstances against a background of land settlement and extensive deforestation. These events are examined from the twin viewpoints of empathy with the past and a man and nature perspective. The writings of Sauer, Wright and Kirk with contributions from contemporaries in the same tradition, such as Tuan and Powell, provide the conceptual basis for this investigation. Official, popular, and scientific appraisals of forest resources are identified and analysed. Within them a number of key issues such as, the displacement concept, forest influence ideas, a timber famine, and a debate on indigenous forest growth rates emerge. Within this context, the value of holding the role of individuals and ideas in juxtaposition with wider social and economic forces to allow a balanced explanation becomes apparent.

NOTES

1. Abbreviations in the text

AJHR	Appendices to the Journals of the House of Representatives
AJLC	Appendices to the Journals of the Legislative Council
APC	Auckland Provincial Council
ATL	Alexander Turnbull Library
bm	board measure
CCL	Commissioner of Crown Lands
CPC	Canterbury Provincial Council
HBPC	Hawkes Bay Provincial Council
MHR	Member of the House of Representatives
MLC	Member of the Legislative Council
NZB	New Zealand Bills
NZPD	New Zealand Parliamentary Debates
NZS	New Zealand Statutes
OPC	Otago Provincial Council
SPC	Scenery Preservation Council
Sp ft	Superficial feet
WLB	Waste Lands Board

Where archival material has been referred to in the text, a full description of the files is given in the bibliography.

2. Measurements

Units of area, distance and measures of sawn timber have been left in their original form. In some cases there is no easily comparable metric equivalent. Many of the values cited throughout the thesis are estimates. Displaying them in metric terms to several decimal places creates a false air of accuracy while to round the metric equivalents is to add further uncertainty to the original estimate

2.471 acres equals 1 hectare

640 acres or 1 square mile equals 2.59 square kilometres

Sawn timber measurements are expressed as superficial feet (sp ft) although the equivalent board measure (bm) was used by State Forest Service from the 1920s.

1 foot board measure refers to a piece of timber 12" x 12" x 1". This is 1/12 of a cubic foot.

1 cubic foot equals .0283 cubic metres.

CHAPTER I

INTRODUCTION

1.1 INTRODUCTION

Three scholars, Carl Sauer, John Kirkland Wright and William Kirk have made original and substantial contributions to historical geography. This thesis draws upon a range of perspectives on man and environment contained in their writings, which after being rather neglected during the 1960s, have enjoyed renewed interest since the mid 1970s. Sauer, Wright and Kirk, each with their own special viewpoint, shared a concern for explaining the past in terms of the understandings and beliefs of earlier inhabitants. They also emphasised links between man and environment.

These same perspectives of man and nature and empathy with the past provide useful insights for exploring the means by which societies adapt to their physical environments and utilise natural resources. The particular context in which these ideas are examined in this thesis, is New Zealand from 1840 to the 1930s focussing upon the development of policies and management procedures for forest resources.

Fernow (1907), in one of the earliest studies of forest history, identified four stages in the development of forest policy:

1. forest destruction for farm and pasture
2. restrictions on forest use and conservative logging
3. efforts to encourage regeneration naturally and by planting
4. sustained yield management.

Events in New Zealand follow a similar pattern, but with exotic afforestation playing a particularly prominent role. An explanation for this departure lies in the attitudes displayed toward forest resources in nineteenth century New Zealand. Forest policy in New Zealand evolved

slowly and hesitatingly throughout the nineteenth and early twentieth centuries. Small gains were sometimes suddenly lost. Exogenous factors on occasions played a central role in these and other developments in forest policy and management. The majority of these policies and management procedures evolved in a generally unsympathetic social and economic milieu that emphasised the virtue and progress of settlement.

When Europeans began organized settlement in New Zealand, around 1840, the indigenous forests extended over more than 50 percent of the country. By the time the State Forest Service was established in 1921, less than 20 percent of the land was under forest. The task of this thesis is to document and interpret the emergence of forest policy and management in New Zealand throughout this period, developing as it did against a backdrop of extensive deforestation. Forest lands were initially more valued for the soil beneath them rather than the timber upon them. The earliest management proposals were concerned with ensuring timber supplies were available. Slowly througnout the nineteenth century other rationales for forest management developed, including soil and water protection and preservation for aesthetic considerations.

The remainder of this introductory chapter serves to elaborate the conceptual orientation of the thesis and to develop forest history as a field to which historical geographers may contribute. A subsequent section suggests means by which the conceptual approaches adopted here may expand the understanding of the forest history and historical geography of New Zealand.

1.2 MAN AND NATURE, EMPATHY WITH THE PAST: TWO THEMES

The word "geography" is derived from the Greek "ge" meaning the earth and "graphein", to write. These origins indicate the concern

that much early geographical writing paid to the relationship between man and nature. Olwig (1980) has highlighted the importance of society and nature in the contribution of pioneering geographers such as Schouw, Marsh, and Reclus. One of these three, George Perkins Marsh, produced in 1864 a perceptive analysis of society and the physical environment entitled Man and Nature. This volume is also regarded as one of the mainsprings of the early conservation movement in the United States of America. Marsh referred to Man and Nature as, "a little volume showing that whereas (others) think that the earth made man, man in fact made the earth" (Lowenthal, 1965, ix).

Carl Sauer, one of the foremost historical geographers of the twentieth century, acknowledged Marsh's contribution to geography and simultaneously was critical of the "great retreat" as the discipline moved towards more narrowly defined concerns during the 1930s and 1940s. He insisted that human geographers be conscious of the physical environment:

> "A geographer, I submit, may properly be a student of physical phenomena without concerning himself with man, but a human geographer has only limited competence who cannot observe as well as interpret the physical data that are involved in his studies of human economies"
> (Sauer, 1941, 5)

Sauer's reiteration of the society and nature tneme remains pertinent in view of recent developments in geography during the 1970s and 1980s.

Kirk (1951) also stressed the importance of a man and nature perspective when he quoted from the French geographer Vidal de la Blache who emphasised that geography was to "grasp and relate" the "creators of history with organic and inorganic nature" (Vidal de la Blache in Kirk, 1951, 551). This facet of Kirk's paper has tended to be overlooked and it is more frequently cited for its initial formalization of perceptual and behavioural approaches in geography.

Sauer, Kirk, and another geographer, Wright, all suggested means

by which the man and nature theme may be examined in the past and over time. Sauer emphasised that an understanding of society and nature required the recognition that human responses to an environment do not depend solely upon physical stimuli or logical necessity, but also on acquired habits which are essentially cultural traits. Understanding, therefore, requires appreciation of the context and an ability to empathise with former inhabitants of regions:

> "Therefore as a preliminary caution every culture or habit must be appraised in terms of its own learning, and also habitat must be viewed in terms of the occupying group. Both requirements place a severe tax on our ability as interpreters"
>
> (Sauer, 1941, 8)

Of the historical geographer, Sauer stressed,

> "One might say that he needs the ability to see the land with the eyes of its former occupants from the standpoint of their needs and capabilities"
>
> (Sauer, 1941, 10)

A discussion of the role of imagination in geography by Wright (1947) offers some insights into ways in which a land may be seen through "the eyes of its former occupants". Wright considers a variety of "terrae incognitae" and distinguishes between promotional, intuitive and aesthetic imagining. Promotional imagining is conditioned by a tendency to defend personal causes and is dominated by bias, prejudice, partiality, fear, greed and love. The desired illusion rather than the necessary truth is the product of this form of imagining. Intuitive imagining attempts to secure realistic conceptions of unknown places but while notionally objective it is really subjective as personal impressions of selected facts outweigh impartial consideration of all the evidence. Aesthetic imagining is a subset of promotional imagining. Its dominant purpose is to enjoy the process of imagining and convey the result in written or illustrative form. Wright was also concerned with the role of geographical knowledge,

both true and false, as a means of understanding the past. He termed this study "geosophy" and saw it as analogous to historiography.

Wright, like Sauer, appreciated that a duality existed in geographical studies. "Geography", he argued is used interchangeably for both "a species of human awareness and for actualities real or imagined" (Wrignt, 1966, ix). Two unreconciled geographies are simultaneously in existence which, argued Wright, led to a confusion of purpose:

> "This ambivalence has given rise to a great deal of obscurity, misunderstandings, and arguments. In ordinary speech we do not call ornithology "birds" nor birds "ornithology," but we do use the same word ("Geography") for geographic actuality that we do for geographical awareness (discourse, knowledge, belief) pertaining to such actuality"
> (Wright, 1966, ix)

The importance of imagination, geographical awareness and cultural viewpoints had been considered by Kirk (1951). In a subsequent paper (Kirk, 1963) he restated and elaborated his arguments. In most geographical problems there is an environmental aspect. This he insisted had been maintained, though muted by more systematic scientific concentrations upon specific environmental problems. The legacy was an artificial separation of man and environment.

Kirk outlined means by which geography can continue as a unified discipline, that is, with man and environment as a focus. He considered three means of attaining this: firstly, by studying complexes of material to which geographers could claim exclusive rights; secondly, by redefining geography in terms of common methodologies; and thirdly, by examining the types of problems that geographers study. Kirk preferred the third option. Drawing on recent developments in psychology, he argued that the true division of the geographical environment is not between man and nature, but between the phenomenal and behavioural environments. The phenomenal environment includes all natural events and man created or altered milieu. The behavioural

environment, borrowing a term from Gestalt psychology, is a "psychophysical field in which phenomenal events are arranged into patterns or structures (Gestalten) which acquire values in cultural context" (Kirk, 1963, 366). Facts from the phenomenal environment which do not enter the behavioural environment have no meaning.

The focus of many geographical investigations during the 1950s and 1960s was directed away from using man and nature as an organizing theme. This occurred with singularly unfortunate timing, as it coincided with the popular growth of environmentalism during the 1960s.[1] Practitioners such as Sauer continued to write around the man and nature theme (eg. Sauer, 1981), but many geographers dissatisfied with regional studies adopted overtly deductive methodologies and quantitative techniques in a search for general theories as human geography was attempting to establish itself as a distinctive social science (see Johnston, 1979, 82-111). The undoubted result was an enhanced understanding of many geographical phenomena, but at a price: a loss of synthesis.

Throughout the 1970s and 1980s there have been signs of a further stocktaking and reorientation away from a strongly quantitative approach to human geography. Some viewpoints traditionally central to the interests of human geography in general. A concern for examining man as the agent of change rather than the subject (the landscape) echoes the work of Sauer, Wright and Kirk. Those concerns have been carried further by geographers such as Relph (1970) and Guelke (1974), who allied their work to a phenomenological and idealist philosophy respectively as opposed to the positivism that lay behind the quantification of the 1960s.

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1. The move towards a positivist quantitative focus also overshadowed an important essay in the Sauer, Wright and Kirk tradition by Lowenthal (1961).

Yi-Fu Tuan is another who has provided a useful elaboration of the man and nature perspective. This is especially important in view of a recent tendency to focus upon complex environmental problems to the exclusion of human factors:

> "It is useful to recognize human passions in any environmental calculus, they cannot be excluded from the theoretical approach because man is, in fact, the ecological dominant and his behaviour has to be understood in depth, not merely mapped"
>
> (Tuan, 1974, 2)

Tuan also draws an important distinction between perceptions and attitudes towards the environment. Perception he describes as the selective response of the senses to "external stimuli and purposeful activity" (Tuan, 1974, 2). In contrast, attitude is the product of a succession of perceptions which gain stability and is "primarily a cultural stance a position one takes vis a vis the world" (Tuan, 1974, 2).

Some "humanistic" geography that has developed since the mid 1970s, while concerned with the central role of individuals and their perceived worlds, may be regarded as a reaction to the excesses of quantitative geography. One writer claims it is "best identified as a form of criticism" (Entrikin, 1976, 615). Further, much humanistic geography has been concerned with why such geographies may validly exist and, occasionally, how they may be undertaken. The prodigious and innovative writings of Tuan (1974, 1979, 1979a) provide a still rare substantive example of humanistic geography in practice. The heritage of Sauer, Wright and Kirk, as it is built upon by Tuan and others such as Powell (1970, 1978), provides a sounder basis for investigation.

The individual, coloured by cultural orientations with a range of environmental ethics, plays a central role in much research in human geography. Sauer (1941, 4) considered "the first hand study of the individual great and genial figures of the past" as one of the under-

pinnings of geography. He nominated Marsh as a suitable candidate for attention. A reconsideration of the contribution of Nathaniel Shaler to the conservation of natural resources in the United States of America by Livingstone (1980) is a recent example of this type of investigation. More often than not, singularly great individuals are not the sole focus; instead, the researcher may be concerned with minor government officials, politicians and landowners. Collectively all these people contribute to a cultural view of the environment and its resources.

It has been asserted that, "geographers interested in the nineteenth century must accord a high profile in their analyses to the men, their ideas and institutions, for these were so largely responsible for the changing personality of each region" (Powell, 1970, xiii). Powell supported this statement with a detailed examination of land settlement in Australia. The observation is equally true for understanding nineteenth century European settlement in New Zealand - and for assessing related issues such as natural resource management.

The man and nature tradition and empathy with the past central to the writings of Sauer, Kirk and Wright has been reinforced by the more recent contributions by Tuan and Powell. These perspectives offer powerful insights into the ways in which individuals relate to their environment and its natural resources. They offer an incisive and apt insight into the management of forests in New Zealand.

1.3 HISTORICAL GEOGRAPHY AND FORESTS

An evocative essay by Sears (1956) considers the multifaceted and sometimes contradictory relationship between man and the forest whereby it was simultaneously,

> "prized for the materials it yielded and for some of the functions it performed, but it was also regarded as a rival for the space needed for crops and flocks"
> (Sears, 1956, 4)

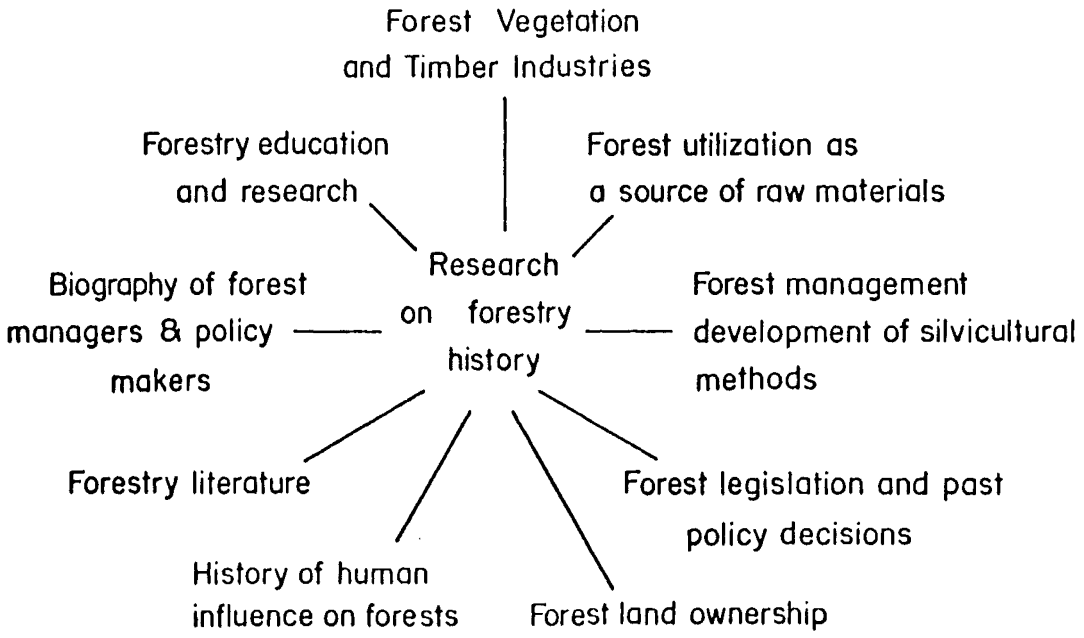
Man's relationship to the forest has been the concern of various disciplines, including historical geography. Landscape evolution, the timber industry, national parks and forest administration have all attracted some attention form historical geographers. The conversion of forest lands to settlement has been an established theme in historical geography (eg. Darby, 1951, 1956). Generally the forest has been only one of the many elements examined in wider studies of landscape evolution (eg. Williams, 1974). In contrast, other historical geographers have focussed specifically on various aspects of forests. Dinsdale (1965), for example, examined the timber industry in New York State during the early nineteenth century and Wynn (1981) has provided a detailed analysis of lumbering in colonial New Brunswick. Another area of concern has been the wilderness concept and the related national parks movement (eg. Johnson, 1979). Forest policy and management strategies have also been studied in an effort to understand changing attitudes to natural resource management (eg. Powell, 1976, Wynn, 1977b).

These studies utilize a range of viewpoints, from the synchronic concerns of classical historical geography, through expositions of economic theory, to studies in natural resource evaluation. This is not an exhaustive listing. Rakestraw (1979), a specialist forest historian, has suggested other approaches including economic colonialism, regional planning, biographical and comparative frontiers, each of which is potentially amenable to treatment by historical geographers. Mantel (1964) proposed an expansive ninefold classification of approaches to forest history (Figure 1.1). These ranged from biographies of forest managers to vegetation histories. Typically however, forest history examines human interaction with forest resources.

Geographers once conceived of resources in a static fashion as tangible and finite objects. Usually a distinction was made between

Figure 1.1

Mantel's nine areas of research into forest history



Mantel (1964)

renewable resources such as forests and non-renewable resources such as coal. These concepts have been revised to emphasise that resources are not fixed but "become" to satisfy wants. The biophysical environment presents opportunities and restraints. O'Riordan (1971) asserts that this view of resources is especially geographical in nature as it links man's cultural and biophysical environments, which in turn vary across time and space. While emphasising that any single definition of resources was inadequate, O'Riordan suggests that they may be regarded as,

> "any attribute of the environment appraised by men to be of value within constraints imposed by his social, political, economic, and institutional framework"
> (O'Riordan, 1971, 4)

Thus natural resource definition and utilization contains two explicitly geographical traits: a concern for the man-nature interface and the spatial and temporal variations in this relationship.

The dichotomous outlook towards forests as a resource and as a barrier to settlement perhaps explains why they were the subject of early attempts to regulate and rationalise their use. Indeed, the conservation movement as such in the 1890s gained momentum around the question of forest utilization (Pinchét, 1937). There were other perspectives however, and Shaler's contribution and emphasis on soil conservation has been overshadowed (Livingstone, 1980).

But is it valid to claim that rationale resource management existed in the nineteenth century; the age of material progress. Judged by their contemporary expectations, the alienation of the public domain and the destruction of its forests may be described as a "rational" use. Duerr (1975) argues that management,

> "is the process of making and effectuating decisions to meet people's goals. In the case of the early public forest, the goals were clear, and the values derived from these goals were fairly clear. The decisions taken were consistent with those ideas: they were rational . The values were appropriate to the times. Since then values have changed."
> (Duerr, 1975, 2-1)

Lowry (1977) adopts a similar position:

> "Many such patterns of human activity, of course have had highly destructive impacts on the forest environment. Clearing for agriculture, for example, might be considered planned destruction of the forest."
> (Lowry, 1977, 18)

However, although the various actors may behave in a rational and reasoned manner, their egocentric and short term perspectives may be collectively detrimental: viz Hardin (1968) and the Tragedy of the Commons.

From the pre-industrial period to about 1900 natural resources such as forests were typically "mined", occasionally in a regulated fashion, rather than "harvested". In O'Riordan's words,

> "Rationality was not yet evident: resources were developed rather than managed, for production and consumption depended primarily upon willingness to pay and the maximisation of net private gain, rather than upon the optimisation of net social benefits"
> (O'Riordan, 1971, 7)

The demands for timber, great in the industrializing world, and loss of forest lands to settlement produced in some quarters a shift away from "planned destruction" to the sustained yield management of forests. Subsequently, non-timber related rationales for forest protection, such as flood protection, scenic value and as wildlife sanctuaries were also perceived.

The forest has received scattered and enduring, though never systematic, study in New Zealand historical geography. Forests generally receive mention in the general and regional overview where they comprise one important element of landscape change (eg. Cumberland, 1941, Clark, 1949, McLaskill, 1960).

Other historical geographers have specifically examined the timber industry. Stokes (1966) produces a comparative study of timber milling in Northland and colonial New York, in the late eighteenth and early nineteenth centuries. Arnold (1976) more directly draws attention to

the important role of the forest sector in the economic development of nineteenth century New Zealand. Having emphasised the importance of wood as a building material, fuel, raw material for constructing many basic items and source of revenue, he argues that it has not received attention equal to its importance. This, suggests Arnold, is because it lacks the "colour and drama" of the gold rushes and land wars in New Zealand.

Another cluster of publications are concerned with perceptions of and attitudes towards the natural environment. Shepard (1969), through diarists' accounts, explores the reaction of Europeans to a new environment: a landscape which combined elements that were novel with the familiar. The indigenous forest, "the bush", emerged as a persistent motif (eg. Franklin, 1960). Images of "the bush" are further examined by Johnston (1981).

The remaining studies focus on forest policy and management. Wynn (1977a, 1979) has examined in some detail the circumstances which led to the passage in 1874 of the first national forest legislation in New Zealand. A smaller study (Roche, 1981) suggests that land allocation pressures have produced an imbalance in favour of forest types, typically on small sites, in the country's scenic reserve system.

Ventures into New Zealand's forest history have been largely the preserve of professional foresters surveying the past activities of their profession. These writings, voluminous in comparison with the output of historical geographers, may be classified on the basis of the scale and scope of the work and the intentions of the writer. Represented are historical overviews of forest administration, studies of specific issues and areas, reflective memoirs and propaganda pieces. The large scale historical overview is best represented by Poole (1969). A former Director-General of Forests, Poole specifically

addressed the question of the development of a forestry policy in New Zealand from the Forest Trees Planting Encouragement Act, 1871 up until the late 1960s. Simpson (1973), a former Forest Service Logging Superintendent, in Kauri to Radiata sets out to recount the development of the timber industry in New Zealand, while Allsop (1969), a former Director of the Management Division of the New Zealand Forest Service, examines events from the formation of a separate Forests Department in 1919 until the 1960s.

Examples of writings on specific issues and areas are provided by Brown and McKinnon (1966) in a study on the appointment and work of Captain Inches Campbell Walker, who had a shortlived career as Conservator of Forests under Vogel's Forest Act, and Brown (1968), in a similar paper on Professor Thomas Kirk, the Chief Conservator of Forests under the 1885 State Forests Act. Other writers have focussed on Forest law in both inventory (Boardman, 1938, 1940-41, 1942-44) and interpretative form (Boardman, 1951) forests and mining (Foster, 1936), the impact of the Maori on the forest (Cameron, 1961, 1964), and changes in the management of Kauri forest (Barton, 1975).

Reflective memoirs are represented by a manuscript written by Alexander Entrican, Director-General of Forests from 1939 to 1960, dealing with the development of the Murupara scheme in the 1950s (Entrican, 1963, MS ATL). The final category of propaganda items is used to describe papers such as The Progress of Forestry in New Zealand (Ellis, 1922), which was prepared for the Australasian Association for the Advancement of Science (AAAS) meeting in 1922, and Entrican and Holloway (1956) who contributed a chapter to the World Geography of Forest Resources. Another example is provided by Coughlan (1964) in a brief review of growth of State forestry in New Zealand.

Publications by professional foresters constitute the bulk of

'forest history' literature for New Zealand. However, it is important to compare this with the treatment similar topics have received from academic writers. Rakestraw (1972) distinguishes between 'academic' and 'non-academic' writers of conservation history in the United States. The distinction seems equally valid for forest history in New Zealand. Rakestraw's assessment of non-academic writers is highly sympathetic. He notes that they tend to be professional employees in the field of resource management who write from their personal experience and professional background (eg. Poole, 1969). The academic author, Rakestraw adds, tends to have a liberal arts background, usually lacks humour in his writings, and is prone to over-generalise and over-simplify issues (Rakestraw, 1972, 273).

The disadvantages of the non-academic efforts are threefold: they may try to justify their own actions and that of their departments, they may slight historical sources, and their organisation is sometimes inadequate. However, Rakestraw believes that the advantages of non-academic works outweigh their limitations. Their redeeming features include, he suggests, tolerance for human frailties, a feeling for landscape, an understanding of decision-making processes, and an ability to make professional judgements about technical questions. The problems faced by academic writers primarily involve interpretation of technical and scientific questions in essentially non-technical terms. In practise the academic and non-academic contributions may complement each other.

1.4 THE CONTRIBUTION AND ORGANIZATION OF THE THESIS

This thesis is intended to demonstrate the contribution that historical geography can make to forest history. At a substantive level forest policy and management is focussed upon from the beginnings

of organized European settlement in 1840 through to the 1930s. This is undertaken with emphasis on the relationships between man and nature over this period while attempting to understand, through the eyes of former occupants, patterns of forest resource management.

To a degree, perhaps as a consequence of adopting a geographical viewpoint, all nine of Mantel's areas of research into forest history (Figure 1.1) are touched on to some extent in the thesis. Some areas receive greater attention; they include, forest management, forest legislation, human influences on forests and forest education and research. These also define the limits of the thesis: the timber industry is not dealt with directly at any length.

At a substantive level this thesis is intended to illuminate a number of relatively unexplored avenues of research and to approach a familiar theme from a different angle. The comparatively unfamiliar areas comprise,

1. the European perception and appraisal of the forest resources during colonization and "improvement" of New Zealand. This encompasses views of forest as convertible to arable and various rationales for forest protection

2. to illuminate the origins and evolution of forest policy in New Zealand and outline structure and organization of forest management

3. to examine the late nineteenth century origins of a forest conservation movement in New Zealand

4. to complement the "non academic" studies of New Zealand forest history authored mainly by professional foresters.

From the perspective of land settlement, the forest is already a familiar theme in New Zealand's past development. Arnold (1976) and Stone (1973) indicate the important contribution made by the forests and associated manufacturing activities to economic life in nineteenth and early twentieth century New Zealand. The forests seem to have been considered almost exclusively from the viewpoint of settlement.

Only their widespread and usually wasteful removal gains mention. To more fully understand the pioneering phase and beyond, the forest should be examined in its own terms. It is undeniable that large scale deforestation has accompanied European settlement in New Zealand. In 1840, approximately 62 000 square miles, over 50 percent of the land area, was under forest; by 1920 this had been reduced to 19 000 square miles (State Forest Service, 1923). Within this context it seems equally valid to ask how and why some forest lands were not thrown open to settlement, and look at the policies and management techniques that were used to achieve these ends. Forestry advocates, although never large in numbers, often wielded influence beyond proportion to their size.

For the purposes of this study the various themes and viewpoints that are utilized have been organized with reference to studies by Powell (1970, 1978) on nineteenth century European land settlement in the new world. New Zealand shares a common heritage with other outposts of the British Empire, but local environmental conditions have also played an important role in developments.

A modelling approach adopted by Powell (1970) for a study of land settlement in the State of Victoria, Australia, from 1834 to 1891, provides one possible organizing framework. It distinguishes between official and popular appraisals of the environment, recognizes the interactions and modifications that take place and accounts for much of the progressive modification of the physical environment. Drawing on this earlier work, Powell (1978, 102) subsequently developed a generalized model of political involvement in decision-making in resource management.

These organizing structures clearly contrast the roles of individuals and institutions. They are readily adaptable to an examination of forest resources. Frawley (1981), drawing upon Powell (1976) and

Tuan (1974), has investigated rainforest management in Queensland, Australia prior to 1900. He focusses upon the attitudes and actions of individuals and groups, both public and governmental, and explores a number of images which vary across time and space. These modelling approaches appear to have sufficient elegance to offer a structure for the present study, while still allowing individuals and their responses to the New Zealand environment as it affected forest policy and management to be apparent. In diagramatic form the organising structure adopted for this present study is shown on Figure 1.2. The popular and official appraisals of the environment are supplemented by a scientific perspective. This latter viewpoint has been present in forestry since John Evelyn's "silva" of 1664 and Colbert's French Forest Ordinance of 1669 (Lowry, 1977). Hence, it seems pertinent to isolate a scientific perspective to more explicitly judge its importance. Individuals, and sometimes groups, interact within and between each appraisal. The importance of official, popular and scientific views, their composition and concerns varied across time and space, but all fed into a governmental system that produced a policy and management strategy for forest administration.

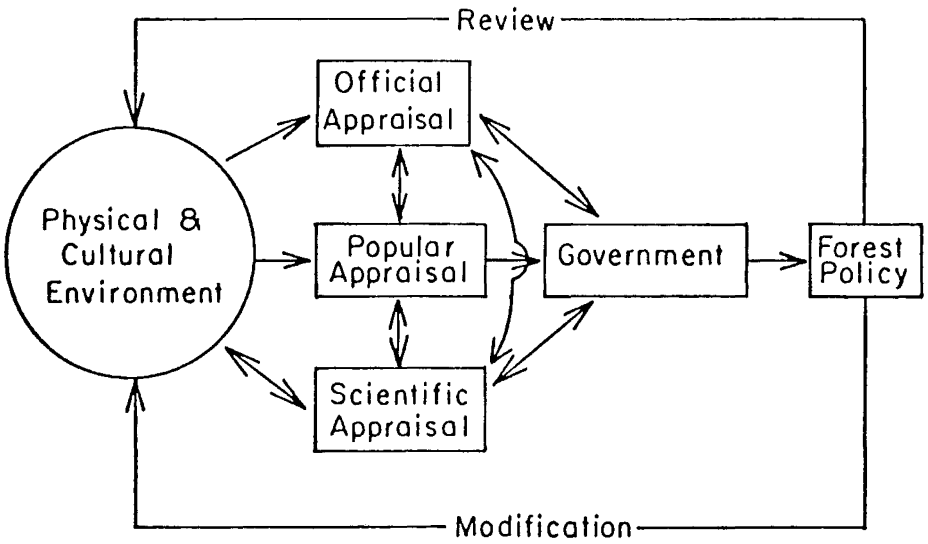
The development of forest policy and management in other countries and in New Zealand, as contained in overviews authored by professional foresters (eg. Allsop, 1969, Poole, 1969), suggests a number of pulses which the model outlined in Figure 1.2 helps to organize. Five major pulses may be identified, some with smaller scale constituent parts. These include:

1. the displacement concept; a belief that the introduced flora was more vigorous and successfully over-running the indigenous species

2. the forest influence concept; a cluster of beliefs that forests presence contributed to rainfall and ameliorated the climate. Later soil and water protection arguments gain precedence

Figure 1.2

MAJOR ELEMENTS IN THE EVOLUTION OF A FOREST POLICY IN NEW ZEALAND.



3. the timber famine, nationally and internationally there was a ready acceptance of the inevitability of timber shortages

4. indigenous forest growth rates; the native forests were considered very slow growing and difficult to regenerate, hence fast growing exotic plantations were favoured to meet future timber needs

5. aesthetic and scientific arguments for forest protection; these provided new rationales for reserving forest.

Initially, scientists explained the success of exotic species in terms of a stronger invading species overcoming the weaker indigenous stock. This question was also important in popular appraisals of landscapes. It encouraged settlement and "improvement" of the land and later retarded forest management as it suggested such an exercise was doomed to failure. The forest influence concept embraced a belief that afforestation and deforestation would drastically influence a wide range of climatic parameters, whereby the condition of the country could be improved or retarded. These ideas had considerable impact on the pattern of forest reserves in the 1880s. The magnitude of timber clearance and the often excessive waste of timber felling and conversion led in the later nineteenth century to a widespread belief in an impending timber famine. Such an outlook speeded the development of new policies for forest management, which because of doubts about the growth rates of indigenous forest species tended to be couched in terms of exotic afforestation. Finally, aesthetic and related arguments, in contrast to the previous four, which were essentially utilitarian in nature, are of importance in that they added a new dimension to forest management. In New Zealand today this takes the form of a National Parks and Reserves system comprising ten percent of the total land area of New Zealand. These themes are all drawn around strong images, but this should not obscure the origins of all attitudes in the understanding of the individual within his

cultural matrix, responding to his environment. The coincidence or lack of convergence of image and reality, so far as the latter is reconstructable, provides an insight into the development of forest management, but the attitudes and perceptions that each image reveals are equally important.

The substantive chapters of this thesis have been organized on a chronological basis. But, as well as highlighting major developments in the evolution of forest policy and management in New Zealand, they endeavour to display attitudes and perceptions of forest resources and the relationship of man to his environment. This is undertaken through a detailed investigation of displacement concerns (Chapter III), forest influences (Chapters III, IV, V), the timber famine (Chapters III to VIII) and growth rate arguments (Chapter VIII). Official, popular and scientific appraisals run across each of these substantive themes. On some occasions one perspective receives special attention. The official appraisal is examined alone (Chapter II) and in interaction with other viewpoints (Chapter VI). Popular appraisals are considered, especially in Chapter III, while scientific attitudes and perceptions are dealt with in Chapters IV and VII. These deliberations have a bearing on two wider questions concerning the relationship between individuals, institutions and the wider social and economic context, to changing appraisals of forest resources and the extent to which developments in New Zealand should be regarded as unique or part of the wider spectrum of European settlement in the New World.

CHAPTER II

REGULATION WITHOUT CONTROL: FOREST MANAGEMENT DURING THE COLONIAL PERIOD 1840-1876

2.1 INTRODUCTION

The management of the indigenous forests of New Zealand from 1840-1876 is usefully described by the phrase, regulation without control. The years 1840 to 1876 span from the introduction of Crown Colony Government to the abolition of the Provincial system. This first period of forest management was subsumed into the wider field of land settlement and may be understood by placing it within the context of the attitudes and aspirations of the settlers. Initially the Crown forests were administrated in a fashion which regulated their use for timber and fuel. The fuller significance of subsequent events such as Premier Julius Vogel's New Zealand Forests Act, 1874 (see Chapter III) and conservationist developments in the 1890s (see Chapter VI) only became apparent through an examination of forest management strategies from the 1840s to the 1870s.

O'Riordan (1971) described resources in a dynamic sense as environmental components which are perceived as valuable within a wider social, economic, political, and institutional context. New Zealand was over 50 percent forested when British sovereignty was declared in 1840. The nineteenth century was a time when laissez faire principles enjoyed wide currency; when "progress" was associated with growth and "improvement". In a young colony these ideas gained expression as a drive to utilise the natural resources and full potentialities of New Zealand. Embryonic forest management existed uneasily with these otner powerful social goals.

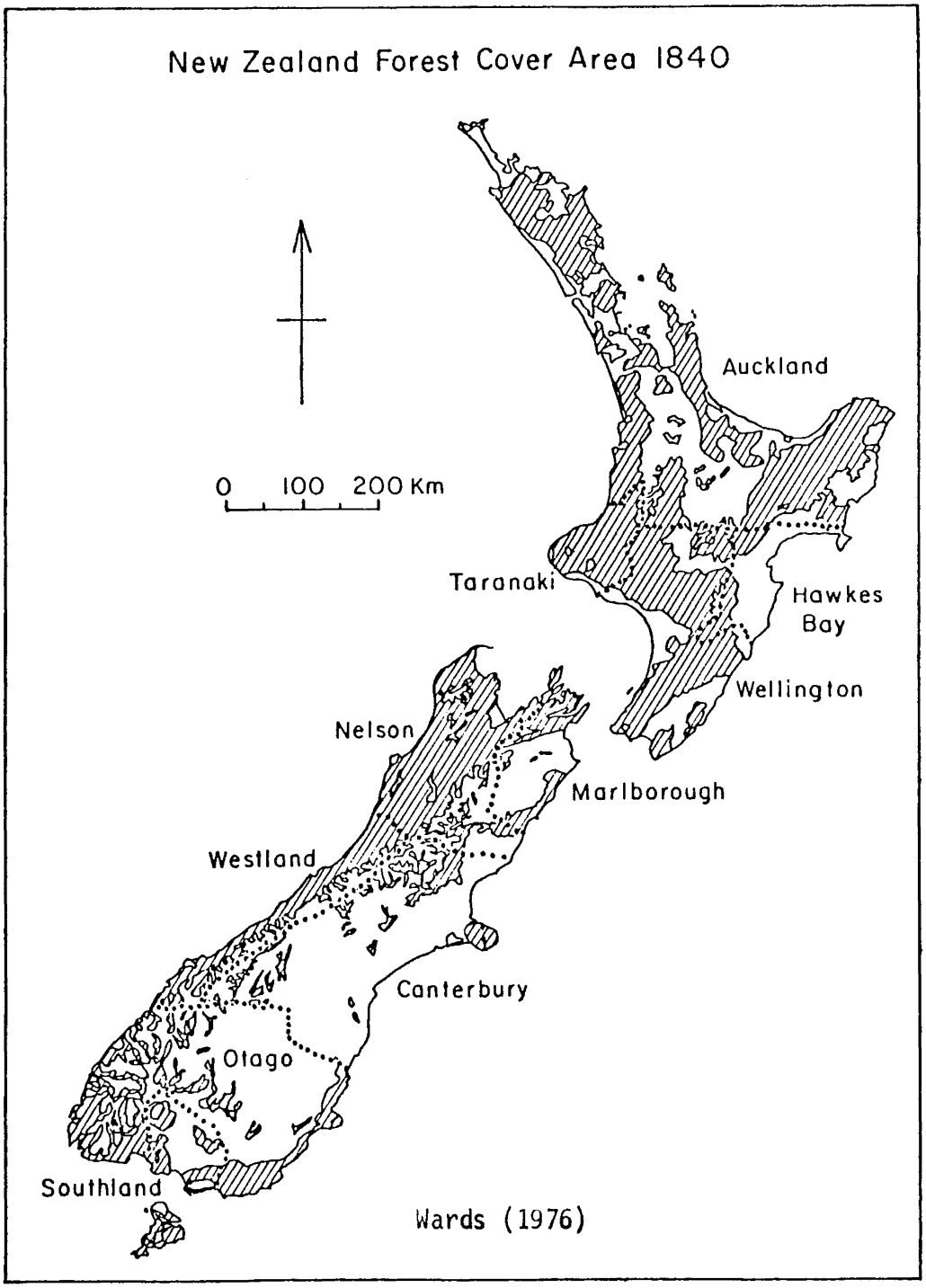
This chapter examines briefly the Royal Navy's proposals for

forest conservation in 1840-1841 before focussing attention upon forest management clauses in various Waste Land Acts between 1854 and 1876. Crown colony contral had been replaced, after twelve years, in 1852 by six and later nine Provincial administrations with a General Government in Wellington (Figure 2.1). The implications and designs behind these forest management proposals concerned with timber licences and reserves are the subject of section 2.3. Some regional examples are discussed in section 2.4, while a period reappraisal from the late 1860s along with a conceptual viewpoint is presented in section 2.5.

In terms of the organising structure discussed in Chapter I (Figure 1.2), this analysis of Crown Colony and Provincial Government forest management is couched strongly in terms of an official appraisal. The official appraisal was the strongest and most clearly defined; it had the greatest bearing upon the formulation of regulations for forest management. This is not intended to dismiss the importance of popular appraisals for some changes in timber regulations may be interpreted as the result of interactions between administrators and settlers. The popular appraisal, however, remains more elusive, although exceptions are provided by Shepard (1969) and Johnston (1981). Rather, it is the contribution of the scientific appraisal that is not considered here. Considerable botanical exploration occurred in nineteenth century New Zealand, but the insularity of scientific viewpoints before the 1870s when the first effective inputs were made, makes it more appropriate to deal with this aspect of forest management in Chapter III.

The sources on which this chapter is based require careful treatment. Material relating to popular appraisals of forests is diffusive and that pertaining to the official perspective in sparse and generally of an impersonal nature, comprising largely of statutes, regulations

Figure 2.1


New Zealand Forest Cover Area 1840
0 100 200 Km
Auckland
Taranaki
Hawkes Bay
Wellington
Nelson
Marlborough
Westland
Canterbury
Otago
Southland
Wards (1976)

and minutes. The challenge to "see the land with the eyes of its former occupants" (Sauer, 1941, 10) is greater than for other times in New Zealand's past. The existing material, largely relates to the South Island provinces of Southland, Otago and Canterbury. This reflects the greater economic and political importance of the South Island for most of the nineteenth century. It also points to the different nature of the forests question. In many parts of the South Island, with the exception of Westland, forest resources were recognized by administrators and settlers as finite. In contrast, the bushcovered North Island was perceived as having virtually inexhaustible forests while land clearance for agriculture remained of central importance.

2.2 THE ROYAL NAVY AND KAURI SUPPLIES, 1840-1841

The first moves to initiate a system of forest management in New Zealand were sponsored by the Royal Navy, and date from 1840 when the islands became a British colony. Secure supplies of timber were of paramount importance to the Royal Navy especially as traditional North American and Baltic sources had become unreliable (Albion, 1926). Where possible, other woods and iron, were substituted for oak (Packard, 1978) and tariff alterations were made to encourage timber imports (Williams, 1966). Potential new sources of timber as distant as Norfolk Island and New Zealand were also investigated.

Closer examination revealed that the Kauri[1] forests of northern New Zealand were well suited for naval purposes. HMS *Dromondary* and *Prince* had been sent to Thames and Hokianga respectively to collect masts in 1820 (Stokes, 1966). The expense of this undertaking had

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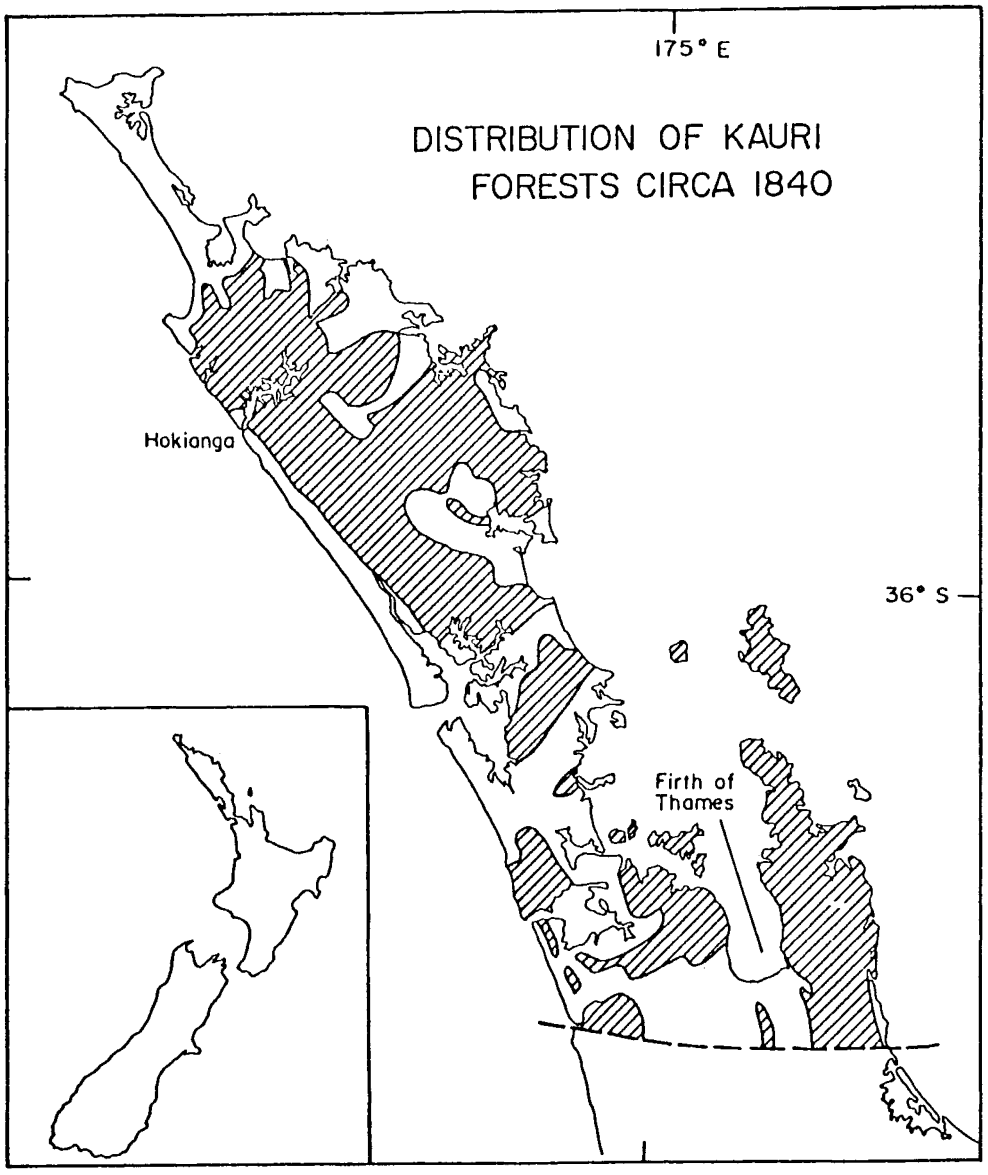
1. Alternatively referred to as Kowrie, Cowdie, Koudie, Kaurie or New Zealand Pine in early records. The species produced straight almost taperless trunks reaching to 30 metres before branching. A list of Maori, European and Botanical names of various trees is contained in Appendix 1.

deterred the Naval Board from utilising the forest resources of New Zealand more fully, but from a distance they maintained an interest in keeping Kauri supplies available. In 1837 Naval personnel were again present to select timber for ship building.

A new level of interest was reached in March 1840, only a month after British soveriegnty over New Zealand had been declared. Captain Sir William Symonds, the Surveyor of the Navy, indicated to the Admiralty that Kauri was now available on "reasonable terms". He urged an expert examination of the Kauri forests and reservation of suitable areas of forest before they were settled. The suggestion was not new; Naval forest reserves had existed in Nova Scotia since the 1780s (Albion, 1926, 349-350). This course of action was urged for two reasons. Firstly, the "great waste and destruction" occurring in the Kauri forests with "forest trees being sacrificed to minor and wasteful purposes and many being burnt" (Symonds to Admiralty, 13.3.40, G1/1). The resinous Kauri remains extremely vulnerable to fire. Secondly, Symonds believed that the French government intended to utilize New Zealand's forest resources. The Admiralty concurred with Symonds whose submissions were eventually drawn to the attention of the Secretary for State. The Colonial Land and Emigration Office was asked to report on the proposals. They did not dispute the quality or versatility of Kauri, but asserted that the requirements of the Navy would come into conflict with those of the settlers. The Kauri forests were restricted to the northern North Island (Figure 2.2) which was also the region of earliest European contact, even though planned settlement occurred further to the south.

"Under these circumstances", the officers of the Colonial Land and Emigration Office wrote,

Figure 2.2



Wards (1976)

> "it appears to us as very reasonable and proper that every facility consistent with the rights of property should be afforded to the acquisitions of this timber for the uses in question. We cannot however recommend that any reservation should be made of the forests as is proposed by Sir W Symonds. As to reserve the forest is to reserve the land, with whatever object it is made Crown Reserves of land in a new Colony are in our opinion impediments to the progress of settlement and hurtful to the interests of settlement."
>
> (Colonial Land and Emigration Office to Colonial Office, 7.1.41, No 8, Enclosure 2, G1/1)

Their opposition was not to the Navy having call upon the forest resources of the colony, but to areas of land being locked up as forest reserves. They proposed an alternative strategy proposed whereby the Crown would have the right to cut Kauri on unoccupied land and a pre-emptive right to purchase Kauri on freehold lands at fixed prices. By these means it was intended to sustain timber supplies and speed the clearance of forest land for settlement, thus appeasing both the Navy and settlers.

Symonds' original suggestion that a qualified person inspect the forests was accepted. The Colonial Lands and Emigration Office also recommended that the Governor of New Zealand issue timber cutting licences for cutting Kauri on the Waste Lands of the Crown. By August 1841, Governor Hobson had received instructions "relative to the destruction of the Kowrie forests of New Zealand and recommending that a Conservator of Kowrie forests should be appointed" (19.10.41, EC1/1). The despatch was read at the October meeting of the Executive Council.

Another despatch read at the Executive Council meeting appointed one of its members, William Cornwallis Symonds, the Deputy Surveyor General at Auckland, and son of Sir William, to the position of conservator of forests. The Admiralty favoured the appointment:

> "he (Captain W C Symonds) is quite aware of the sorts of trees which would be useful for Naval purposes, and is more likely from his Duties as Deputy Surveyor to have an opportunity of becoming acquainted with the tracts of land on which the timber grows"
>
> (Barrow to Stephen, 5.1.40, No 29, G1/3)

The Executive Council postponed making a decision on this matter, but never re-opened the issue, possibly because of the accidental drowning of Captain W C Symonds in November 1841.

However, some action was taken. Governor Hobson issued a proclamation referring to the destruction of Kauri forest and stating his intention to preserve areas for naval use (New Zealand Gazette, 3.11.41). Misuse of the forest, presumably by illegal cutting, indiscriminate use, burning and grazing, were subject to prosecution. A reward of £5 was offered for information leading to convictions. Hobson's proclamation was ineffective because no effective means of policing the regulations existed. This situation was coupled with extravagant waste of Kauri forests which were probably regarded as virtually inexhaustible.[2] Little else was achieved, although Thomas Laslett, an Inspector of the Navy, examined the New Zealand forests during the course of several visits between 1840 and 1843.

Problems of naval timber supplies, exogenous to New Zealand, led to the first attempts at utilitarian forest conservation in 1840. An endogenous concern for forest conservation was delayed until the 1850s (see Chapter III). The measures put forward by Hobson could not be effectively policed, while the more comprehensive schemes of Sir William Symonds were unacceptable, as they clashed with settlement goals. The New Zealand experience here provides an interesting contrast with that of Nova Scotia where the preservation of suitable trees on all lands was unpopular as it was deemed to violate private property rights. Reserves were an acceptable solution because they delimited specific areas for Naval purposes. In New Zealand different reasoning prevailed. Reserves favoured by Sir William Symonds were held to lock

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2. The naturalist Ernest Dieffenbach provided a contrasting viewpoint on the Kauri industry (Dieffenbach, 1843, 228).

up the land and hinder the spread of settlement. Throughout the remainder of the nineteenth century land settlement goals functioned to retard the progress of forest management in New Zealand. Licensing systems and a pre-emptive right of purchase were proposed as an alternative means of ensuring supplies of timber as well as adding to the ease of settlement.

Yet, even if forest reserves had been established in 1841, it is unlikely that the Conservator of Kauri forests would have been able to check illegal and natural losses. Albion (1926, 350) regarded the Nova Scotia forest reserves as a starting point of Canadian and United States forest management systems. Internal frictions prevented this approach from gaining hold in the 1840s.

2.3 TIMBER REGULATIONS UNDER THE WASTE LANDS ACTS, 1850S TO 1870S

There were no immediate indigenous efforts aimed at forest management following on from the failure of the Royal Navy's initiatives of 1840-1841. Instead, the rapid expansion of effective settlement was a fundamental concern of colonial and provincial administrators in New Zealand. Agricultural and pastoral expansion, on the South Island plains and in the North Island forest lands, was equated with the "improvement" of a new land. The natural landscape and its resources existed to be developed and made fit for occupation. Waste Lands Acts were drawn up to facilitate settlement. This title in itself reveals the prevalent attitude of administrators and settlers to unoccupied lands: they were to be turned to freehold and put to "productive" use.

The first forest management provisions to be implemented in New Zealand were contained in the various Waste Land Acts and their attendant regulations. The scant reference that they make to forests

exemplifies the narrowness of the official appraisal of these resources. Only a few clauses were relevant to forest management. Initially these were concerned with the administration of licences to cut timber on Crown Lands, but were later expanded in some provinces to embrace a range of licence types and provide for forest reserves. The clauses of the Waste Lands Acts were intended to regulate timber exploitation. Throughout the 1860s and 1870s some provincial administrators altered these regulations in an attempt to more closely influence future timber supplies by placing more restrictions on exploitation and through the designation of forest reserves.

The first colonial administrative concern for forests stems from Governor Grey's Crown Lands Ordinance of 1849. In essence, these timber regulations continued unaltered after the cessation of Crown Colony government in 1852, through the Waste Land Act, 1854. Amendments and new Waste Lands Acts proliferated through the 1860s and 1870s. An appreciation of the relative unimportance of forest management to generating waste lands legislation may be gained from the paucity of references to timber licensing in Parliament.[3] However, the opportunity afforded by new legislation which occurred in clusters in the 1860s and 1870s was utilised by administrators to revise the timber regulations.

The major ordinances acts and associated regulations controlling timber licensing in New Zealand are summarized in Table 2.1. The table is not an exhaustive list of land legislation; instead, it lists acts and regulations which successively refined the timber licensing system. In terms of timing, most of the acts and regulations are clustered in the mid 1850s and the late 1860s and early 1870s.

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3. Auckland Wastelands Bill, 1870, NZPD, 7: 55, 137; 8: 50
Westland Wastelands Bill, 1873, NZPD, 14: 1124
Marlborough Wastelands Bill, 1874, NZPD, 16: 122, 462, 500
Auckland Wastelands Bill, 1874, NZPD, 16: 600.

Table 2.1

THE MAJOR ORDINANCES, ACTS, AND REGULATIONS RELATING TO TIMBER LICENSING 1849-1875

TIME	CROWN COLONY (1840-1852)	AUCKLAND (1853)	WELLINGTON (1853)	NEW PLYMOUTH TARANAKI (1853)	HAWKES BAY (1859)	NELSON (1853)	MARLBOROUGH (1860)	CANTERBURY (1853)	WESTLAND (1874)	OTAGO (1853)	SOUTHLAND (1861-1870)
Crown Colony											
	Crown Lands Ordinance 1849 (New Ulster)										
1850											
	Crown Lands Amendment and extension Ordinance 1851										
Provincial Government	Timber Licence Regulations 1851 (New Munster)		General Land Regulations 1853		General Land Regulations 1853 (Wellington)						
		Waste Lands Act 1854									
		Auckland Land Regulations 1855	Additional Land Regulations 1855		Additional Land Regulations 1855 (Wellington)	Nelson Land Regulations 1856	Nelson Land Regulations 1856	Canterbury Land Regulations 1856	Canterbury Land Regulations 1856	Otago Land Regulations 1856	Otago Land Regulations 1856
		Auckland Land Regulations 1856 Waste Land Act 1858									
						Nelson Waste Land Act 1858					
		Auckland Land Regulations 1859									
1860						Nelson Land Regulations 1860					
						Nelson Waste Lands Regulations Amendment Act 1863					
											Southland Waste Land Act 1865
										Otago Waste Land Act 1866	
							Marlborough Waste Lands Act 1867				Southland Waste Land Amendment Act 1867
											Southland Land Regulations 1868
1870		Auckland Waste Lands Amendment Act 1870				Nelson Waste Lands Act 1870			Westland Waste Land Act 1870		
										Otago Waste Land Act 1872	
									Westland Land Regulations 1873		
		Auckland Waste Lands Act 1874					Marlborough Waste Lands Act 1874				
											Southland Waste Land Act 1875

The timber licence regulations under Grey's Crown Lands Ordinance of 1849 were issued in the same year and reprinted in the Government Gazette of the Province of New Munster, 22nd October 1851. In precis they provided, at £5 per annum, a licence which entitled the holder to cut timber on a designated area of Crown Land. The activities and capital investments of the timber cutter were protected from interference by others. Occupants who had made "improvements" such as building a tramway, could transfer their licences to individuals of their own choosing. While it was forbidden to cut or remove timber from Crown Lands reserved by the Governor for public purposes, the major thrust of the regulations was towards protecting the rights of the timber cutters rather than the resource - the forest.

In the large part these regulations remained in force throughout the 1850s, 60s and 70s (Table 2.2, 2.3, 2.4). However, some interesting local variations existed under the 1855 and 1856 regulations. All provinces except New Plymouth provided for Timber Licences, although none were issued in Wellington or Hawkes Bay. Possibly this was because forest was regarded as abundant and an obstacle to settlement in these regions. The areas over which licences were held were loosely defined, except in Nelson where ten acres was the maximum allowable. A timber cutter was granted exclusive rights to the area defined in the licence. In Canterbury, where timber was in relatively short supply, additional restraints were placed on licence holders (Table 2.2).

Under regulations issued in the 1860s, the status quo was maintained in Nelson, Auckland, Hawkes Bay, Wellington and Taranaki. Concurrently in Canterbury, and to a much greater degree in Otago and Southland, more comprehensive regulations for forest management were developed (Table 2.3). It is not surprising that the regulations were most

Table 2.2

PROVINCIAL TIMBER REGULATIONS UNDER WASTE LAND ACTS 1855-1856

Province	Licence fee	Licensed area	Rights under Licence	Restrictions
Auckland (1855)	£5 p.a.	defined by CCL[1].	Exclusive use of licensed area right to transfer licence	No cutting on Reserves
New Plymouth (1855)	-	-	-	-
Wellington (1855)	£5 p.a.	defined by CCL	Exclusive use of licensed area right to transfer licence	No cutting on Reserves
Hawkes Bay	£5 p.a.	defined by CCL	Exclusive use of licensed area right to transfer licence	No cutting on Reserves
Nelson	£5 p.a.	10 acres maximum	Exclusive use of licensed area right to transfer licence	-
Marlborough (1856)	£5 p.a.	10 acres maximum	Exclusive use of licensed area right to transfer licence	-
Canterbury (1856)	£5[2]. p. a. or 10/- mth	defined by Waste Land Board	Exclusive use of licensed area. Sawpits within 50 yds unused for 28 days may be disregarded Roads on Crown land, unused for 90 days may be used by licensee without permission	Saw pit must not be within 50 yds of another without consent. Licence may be revoked for wasteful use of timber. Temporary timber reserves may be declared.
Otago (1856)	£1[3].	defined by Waste Land Board	Exclusive rights to licensed area	Waste Land Board may sell the land

Notes:

1. CCL - Commissioner of Crown Lands

2. Timber licences issued under the auspices of the Canterbury Association were held at £1 and later 10/- per month

3. This was a minimum fee, the actual rate was £2/10 for 6 months or the standard £5 p.a.

Table 2.3

PROVINCIAL TIMBER REGULATIONS UNDER WASTE LAND ACTS 1863-1869

Province	Licence fee	Licensed Area	Rights under Licence	Restrictions
Auckland (1867)	£ 5 p.a.	defined by CCL. 7 year Kauri leases (1870)	Exclusive use of licensed area right to transfer licence. Improvements (eg. Tramway) protected	Waste Land Board may sell land. No cutting on reserves
New Plymouth	-	-	-	-
Wellington	As Before			
Hawkes Bay	As Before			
Nelson (1863)	As Before			
Marlborough (1867)	£ 1 acre	10 acres maximum	Exclusive use of licensed area rights to transfer licence	-
Canterbury	£ 5 p.a.	defined by Waste Land Board	As before	As before. The Waste Land Board has power to define areas for which Timber Licences will be issued
Otago (1866)	£ 1 p.a. £ 5 per horse power for sawmill licences	defined by Waste Land Board. Sketch map and survey of area required by Waste Land Board	As before Improvements protected right to further licence over adjacent forest lands	Sawmill licence areas limited to 30 acres per horse power of the mill. Later plant limited to 1 horse power per man employed. Forest reserves may be made
Southland (1868)	Timber licences £5 p.a. or 10/- month	Applicants selection, within areas designated for timber cutting by the CCL	Right to cut timber within licence area	Sawn timber to be removed within a specified time. No licensee to cut within 100 yards of another saw pot unless unused for 28 days. No licensee to use tramway or road unless unused for 90 days
	sawmill licences £4 per acre	sketch map and survey required	Exclusive rights to cut timber. Licences may be renewed at Waste Land Boards discretion	300 acres maximum size. Square or rectangular configurations required

refined in the South Island provinces for settlement was most well developed there. During the 1860s there were the Otago gold rushes and Canterbury wheat boom in the early 1870s. In contrast the Anglo-Maori land wars and the difficulties of bush settlement had slowed the opening up of the North Island. Consequently, pressure on forest resources for timber, for conversion to agricultural purposes and for a growing saw milling industry was greater in the South Island.

The Otago Waste Lands Board made a formal distinction between timber cutting and saw milling licences. The former were available at £2/10 per annum, while the latter were more expensive and calculated not on a flat annual rental, but in terms of the horse power of the plant. In 1862 at a special meeting, the Waste Lands Board outlined "Rules and Guidelines of the Board for the Granting of Timber Licences for Saw Mills" (Otago WLB Minute Books, 3.2.62). There were six major points:

1. all applicants for saw mill licences on Crown Land had to publically advertise their intentions one month before the application

2. if there were no objections a licence could be granted for £10 per horse power of the plants engine

3. an exclusive licence over 30 acres of timber per horse power was granted subject to modification by the Board to avoid monopoly and subject to the quantity of timber available

4. applicants were to provide a sketch map of the area in question and to mark the boundaries by blazing trees or in some other approved manner

5. where mills were erected the present owners were considered to be the first applicants for land immediately adjoining the mill

6. all fees were payable six months in advance.

Within a month the Provincial Superintendent received a memorial from the saw millers opposing the £10 fee. The Waste Land Board agreed to reduce the fee to £5 per horse power for the Taukuka and West Coast

districts where forests were extensive (Otago WLB Minute Books, 31.3.62). It was intended that the £10 fee remain in force in other districts where timber was perceived as less abundant. But for reasons which remain unclear the £5 per horse power fee became standard through the province. A further modification occurred in the late 1860s when the Waste Land Board further attempted to restrict the level of exploitation by tying the number of employees to the horse power of the plant in the ratio of one to one (Otago WLB Minute Books, 20.6.68).

A further series of timber regulations was devised in the 1870s (Table 2.4). Again the most innovative developments occurred in the South Island. By 1874 four distinctive types of timber licence were used in Southland. Of most interest was the means of calculating the licence area and method of payment for saw millers. This was done on the basis of plant capacity, as in Otago, but at a ratio of ten acres per horse power with four years cutting reserve. The fee was calculated off the sawn timber at 3d per 100 superficial feet.

A number of evolutionary trends are discernable. From a simple licence giving a right of occupation obtainable at a fixed rate, a number of specialized forms of licence had been developed, particularly in the South Island provinces. The means of assessing the licence fee became correspondingly more complex through formulae relating plant size to the area held and the rental paid. As the licensing structure became more complex, so the boundaries of the licence area became more tightly defined. The Canterbury licences of 1851-1852, for example, specify only broad locations such as "Okains Bay". By the 1860s surveyed plans and blazing of boundary lines were required.

The most sophisticated sawmill regulations evolved in Otago and Southland where the saw milling industry was of significant proportions. Here simple standard fees and vaguely defined areas were

Table 2.4

PROVINCIAL TIMBER REGULATIONS UNDER WASTE LAND ACTS 1870-1875

Province	Licence fee	Licensed Area	Rights under Licence	Restrictions
Auckland (1874)	£5 p.a.	50 acre Maximum	As before. Timber recognised as a class of land	As before
Taranaki	-	-	-	-
Wellington		As Before		As before
Hawkes Bay		As Before		As before
Nelson		As Before		As before
Marlborough	distinguishes Timber licences £5	As Before		As before
	Sawmill licences	defined by Waste Land Board	As Before	required to advertise
Canterbury		As Before		
Westland (1873)	£5 p.a.	defined by CCL	exclusive rights to licensed area. Timber within 50 years of a licensed saw pot protected	Reserves for the sale of timber. £20 fine for unlicensed cutting
Otago (1872)	as before	as before	as before 7 year occupation leases	as before
Southland (1875)	£5 p.a. for a hand sawyers licence	as before	as before	as before
	Settlement licences £2 p.a.	defined by Waste Lands Board	right to cut timber	-
	Special licences at 5/- per log	defined by Waste Lands Board	exclusive rights to specified timber	penalty for illegal cutting
	Sawmill Licences 3d/ 100 super ft	defined by Waste Lands Board	exclusive rights to licence area	sawmill licence areas limited to 10 acres per horse power with a 4 year reserve

inadequate. The conditions imposed upon saw milling were designed to regulate the rate of exploitation to the extent that the rights of individual millers were protected and the revenue gained was to offset the costs of regulation (plus presumably giving a small return). The extensively forested provinces of Westland and the North Island developed in different ways. An abundance of forest gave rise to an image of inexhaustible resources which, particularly in the north, held up the spread of settlement.

2.4 FOREST MANAGEMENT SYSTEMS IN OPERATION 1849-1876: EXAMPLES FROM CANTERBURY, OTAGO, HAWKES BAY AND AUCKLAND

The embryonic forest management system instituted under various Waste Land Acts operated into the 1870s. The first timber licences appear to have been issued under the terms of the Crown Land Ordinance of 1849, but as these statistics are combined with other licence types they are of limited usefulness. More information is available about the operation of timber licensing during the 1850s and beyond. The chosen examples each illustrate the varying character of timber licensing under different initial conditions and pressures. The Canterbury example provides an illustration of some of the problems encountered in organising a timber licence system with the advent of settlement when the demands for land were finely balanced against a regionally scarce forest resource. The first forest reserves were designated in the province. In Otago the timber licensing system evolved in sophistication beside a timber industry of regional importance and with the ubiquitous spread of settlement. Hawkes Bay provides a sharp contrast to Canterbury and Otago, for although the forest resources were not extensive they were perceived as abundant and efforts were made to speed their exploitation. Timber licensing was not well regarded as

a means to these ends; instead protection through land alienation was favoured. A fairly simple timber licensing system operated in Auckland Province, where the timber industry was of considerable importance to the regional economy, but largely based on freehold forests. The Auckland example illustrates abuse of the timber licensing system through boundary demarcation problems and illegal felling on Maori lands. The former was a widespread problem under earlier timber licensing regulations, the latter, particularly characteristic of Auckland Province.

2.4.1 Forest Management in Canterbury

The destruction of Canterbury forests at the time of organized European settlement in 1850 is reasonably well established from incidental details on early survey plans (Johnston, 1961,[4] Petrie, 1963). Captain Thomas, Surveyor of the Canterbury Association, provided one of the earliest regional resources survey in his Report on the Port Cooper Plains. In this he indicated the location and approximate extent of the major tracts of forest (Figure 2.3). The most important forest blocks he estimated at 240 000 acres or approximately 12 percent of the Canterbury Block (Table 2.5). Additional information[5] on forest land in South Canterbury was provided by the Assistant Surveyor Charles Torlesse.

The general policy of the Canterbury Association was to discourage the idea that purchases of treeless sections would be allowed to fell timber on land not disposed of as this "would interfere with the value of the land" (Canterbury Papers, 1850, 4, 119). However, final arrange-

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4. The base maps are held in the Map Library of the Department of Geography, University of Canterbury.

5. These assessments must be treated with caution. Thomas estimated Alford Forest at 40 000 acres and Torlesse at 15 000 acres.

Figure 2.3

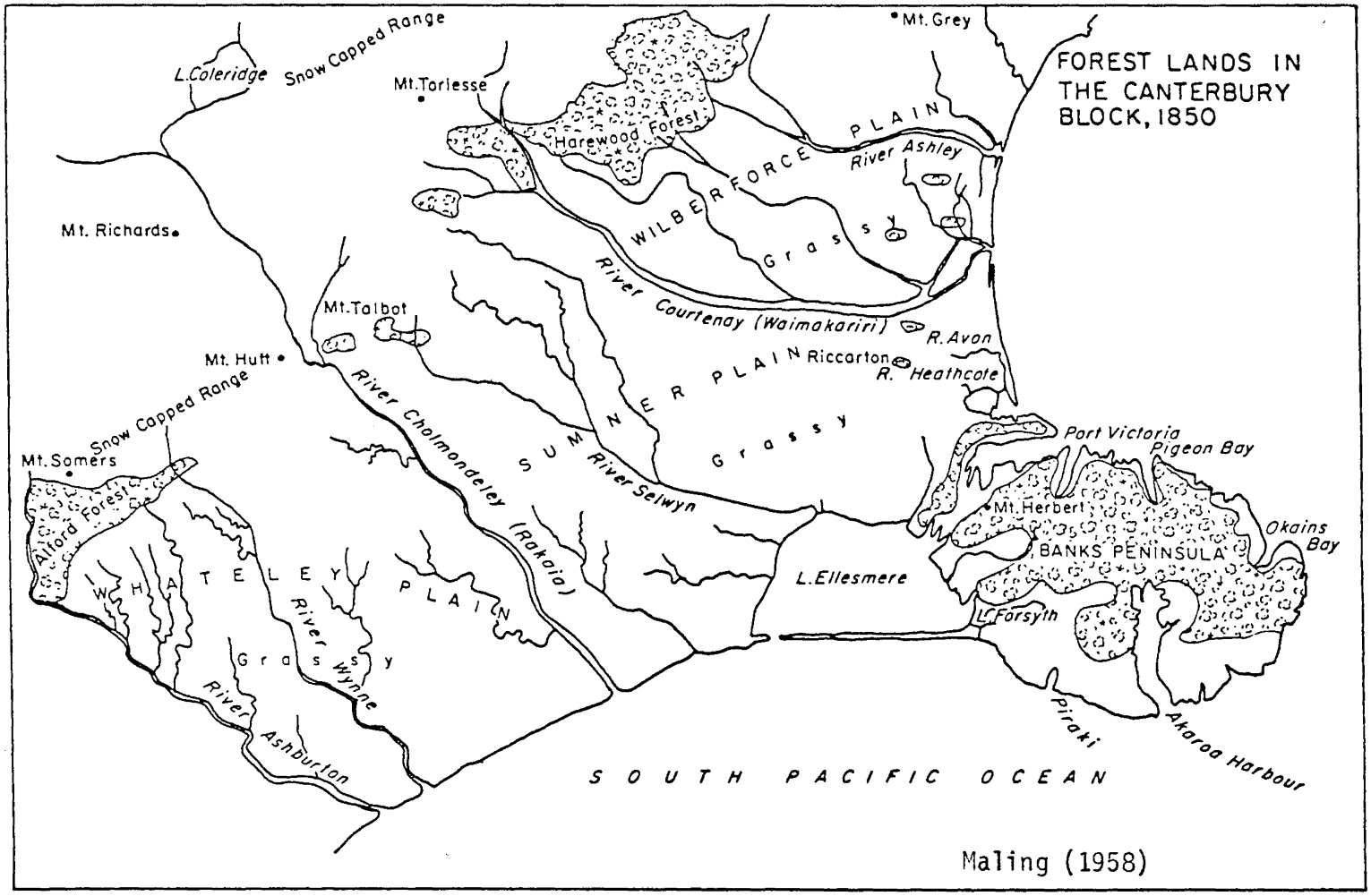

FOREST LANDS IN THE CANTERBURY BLOCK, 1850
L.Coleridge
Snow Capped Range
Mt.Torlesse
Mt.Grey
Harewood Forest
WILBERFORCE PLAIN
River Ashley
Mt. Richards
Grassy
River Courtenay (Waimakariri)
R.Avon
Mt.Talbot
Mt. Hutt
Riccarton
R. Heathcote
Snow Capped Range
River Cholmondeley (Rakaia)
SUMNER PLAIN
Grassy
River Selwyn
Port Victoria
Pigeon Bay
Mt.Somers
Mt. Herbert
Okains Bay
Alford Forest
BANKS PENINSULA
L.Ellesmere
WHATELEY PLAIN
L.Forsyth
River Wynne
Grassy
River Ashburton
Piraki
Akaroa Harbour
SOUTH PACIFIC OCEAN
Maling (1958)

Table 2.5

"WOODLAND" IN CANTERBURY AS ESTIMATED BY CAPTAIN THOMAS

Forestland	Extent (acres)
Harewood forest	60 000
Alford forest	40 000
on Wilberforce Plain	1 800
on Banks Peninsula	134 000
Total	237 100

Source: Maling, 1958.

ments were to be left to the Resident Chief Agent. From the arrival of the settlers in December 1850 until March 1851 no regulations were imposed upon the cutting of timber on unoccupied Crown land. Clark (1926, 7) interpreted the three months of free use as a period of grace intended to allow the settlers to establish themselves. Alternatively, it could be argued that it took time to set up the administrative machinery or that the excesses of free use necessitated more control. A Lands Office circular of 12th March 1851 offers a partial explanation, in part it read:

> "It having been determined to charge in future for all timber cutting licences granted within the Canterbury Settlement as well as for the convenience of parties applying for such licences and also to guard against all indiscriminate and unauthorised cutting of wood."
> (30/51 Lands Office Outward Letter Book, 5/1, 1850-53)

This suggests that after three months of free use evidence of misuse was becoming apparent. A licence fee gave greater regulation by restricting the number of timber cutters.

A timber licence entitled the purchaser, initially for a fee of £1 per month,[6] to cut and remove timber from generally specified localities. Timber Licensing Agents were appointed, with some difficulty for several districts (Table 2.6). Their duties included; warning against illegal cutting, posting notices to that effect, issuing licences, and providing information about unlawful felling. For undertaking these duties the agents were entitled to a five percent commission on the total licence revenue that they collected.

To December 1852, 661 timber licences were issued in seventeen known localities (Figure 2.4). Some patterns are discernible, principally the concentration of licences upon the half of Riccarton Bush,

---

6. Reduced to 10/- a month in either April (Timber Cutting Licence Register 37/8) or May (Brittan to Hay 60/51 Lands Office Outward Letter Book 5/1) 1851.

Table 2.6

CANTERBURY TIMBER LICENSING AGENTS 1851

Agent	District
R McIntosn	McIntosh Bay
J Dicken	Akaroa
E Hay[1.]	Pigeon Bay
M Burke	River Haswell
J Kiele	Port Levy
J Reese	Okains Bay
- Hart[2.]	Lyttelton
R Carr	Riccarton

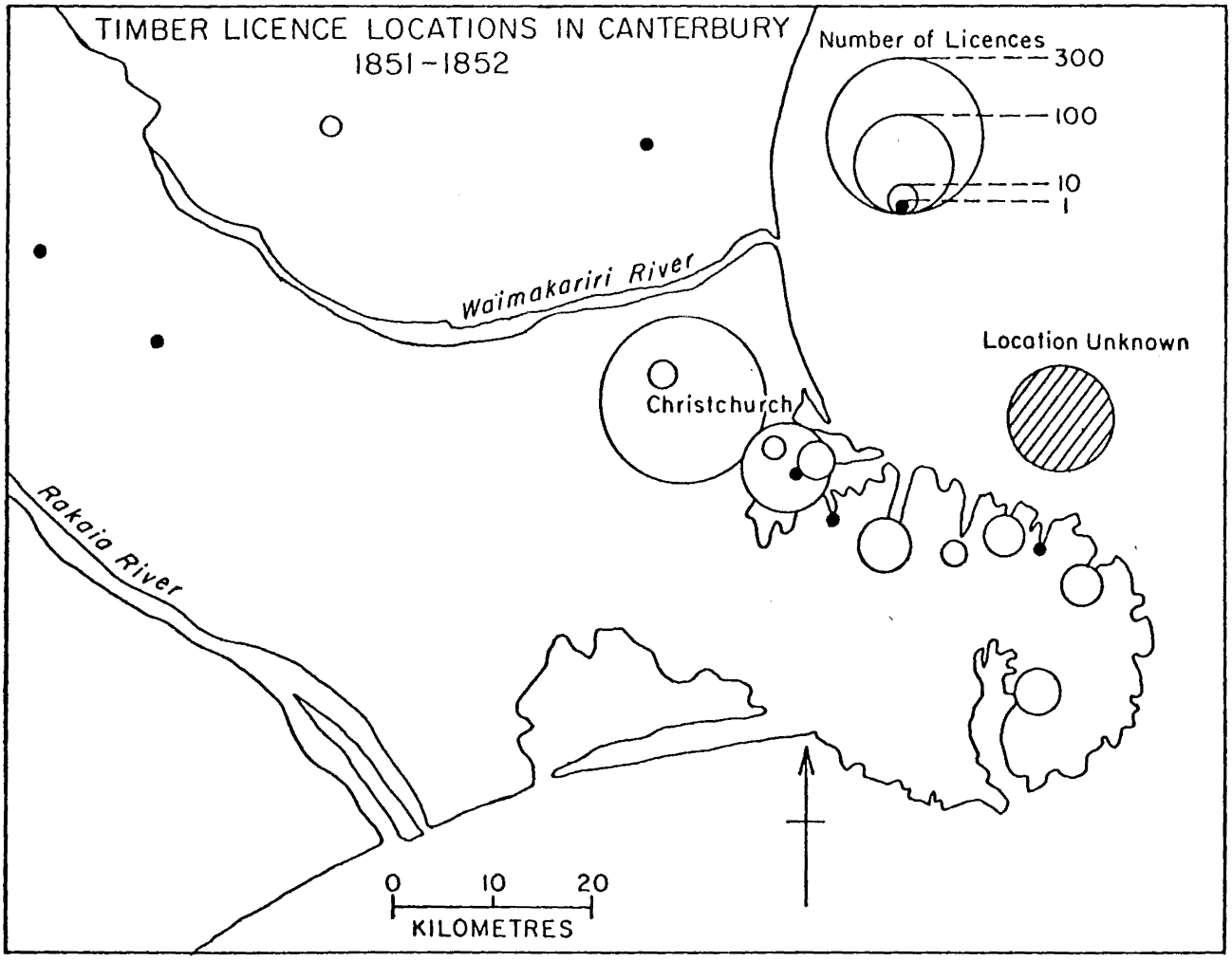
Source: Timber Cutting Licence Register 37/8.

Notes:

1. later resigned and replaced by J Knowles

2. later resigned and replaced by J Lingard.

Figure 2.4



Timber Licence Register

about twenty five acres, gifted by John Deans to the Canterbury Association. Such a concentration on this small area of forest suggests the licensees were engaged in cutting firewood rather than timber and for personal rather than commercial purposes. The sites closed to Christchurch were utilised first and when these were exhausted, licences were taken up on Banks Peninsula and, finally, in the foothills. An indication of the pattern of activity over the next decade[7] may be gained from examining the revenue obtained from timber licences (Figure 2.5). The initial high and rapid fall off suggests extensive use of available forest resources for housing and fuel during the initial establishment of the settlement in 1850-1851. Timber demands in the years immediately following were thus met by fewer licence holders, which suggests the advent of specialized saw milling activities in the province.

From 1851 to 1863 timber licences were issued to all applicants, except where the Waste Lands Board thought it would lead to the cutting of timber on lands already purchased but still unsurveyed, and where lands were reserved under Clause 21 of the Waste Land Regulations or by other Provincial Ordinances. No timber licences were issued for Banks Peninsula from the mid 1850s until 1864. Thomas Cass, the Chief Surveyor, recommended this course of action because purchasers would be denied the use of the forest in their sections and because licensing was leading to waste and abuse through illegal cutting (F/20.4.56, Cass to WLB Chief Surveyors Outward Letter Book No 1, 47/1). During 1863 the survey and demarcation of all purchased lands on Banks Peninsula was completed and the Provincial Executive Council considered it no longer necessary to withhold the issue of timber licences. The Waste Lands Board was reluctant to allow the issue of timber licences,

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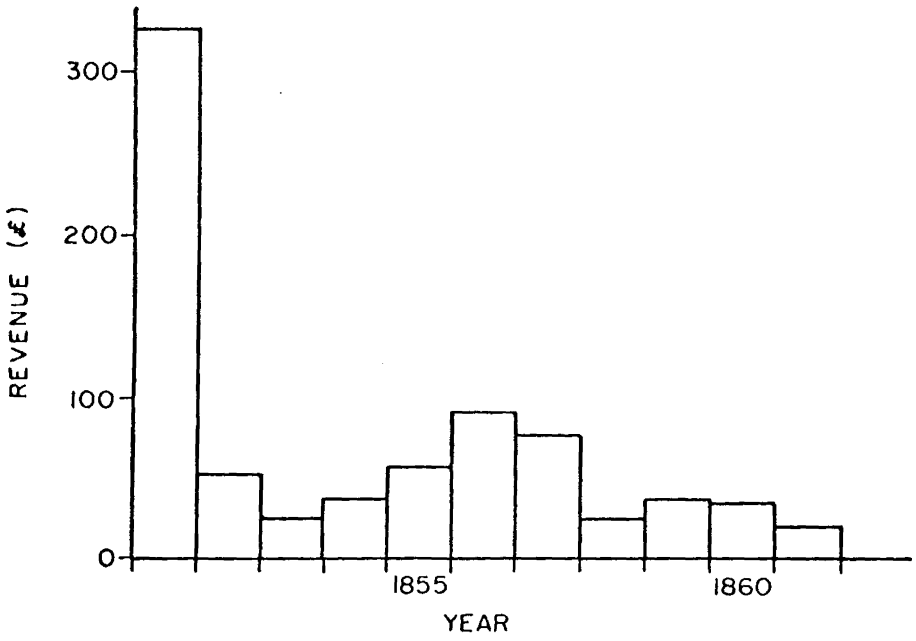
7. Beyond this point timber licence and quarry licence revenues are combined in the official statistics.

Figure 2.5

REVENUE FROM TIMBER LICENSING IN CANTERBURY
1851 - 1861



Timber Licence Register and NZ Statistics

> "which they are of the opinion act injuriously in the interests of the Province and encourage waste and destruction of the timber on the Waste Lands of the Crown"
>
> (218/8.4.69, Chief Surveyor to Superintendent, Chief Surveyor Outward Letter Book, No 4, 47/4)

The Provincial Solicitor's opinion was called for and this led the Waste Land Board to cease withholding the issue of licences. By 1869, however, the matter was reassessed by the Provincial Council and from 1870 no timber licences were issued throughout the Province.[8]

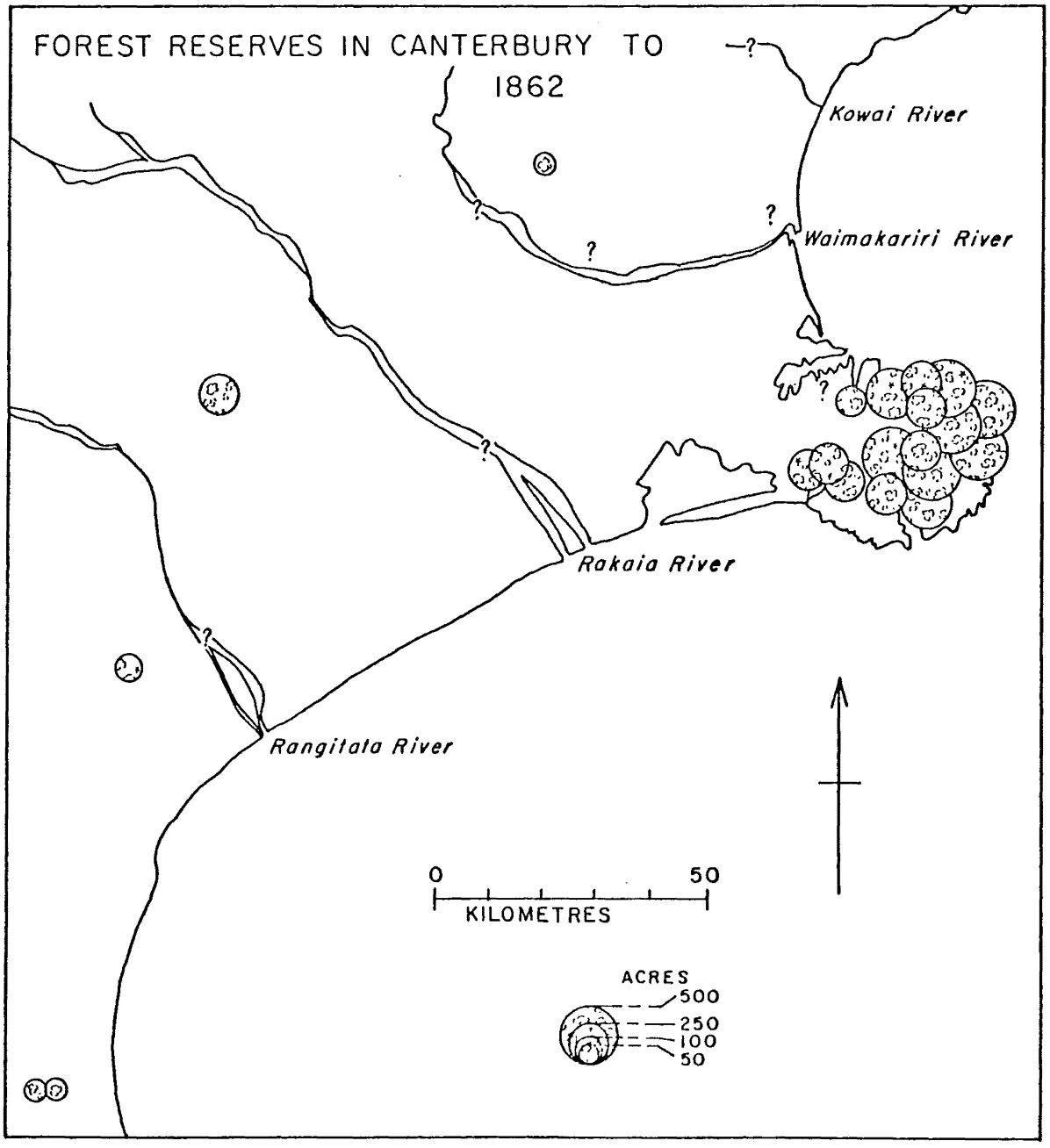
From 1854 timber reserves were used alongside licensing to facilitate the protection and better use of Canterbury forests. Whereas timber licensing, at least in theory, extended considerable protection to the rights of the licensee, timber reserves were designed to make best use of the resource. Although they were intended to protect a forest from indiscriminate felling, it is important to recognise the limits of their purpose. They were not conceived of as inalienable or in terms of sustained use. Instead they were to protect the forest until the timber thereon and fuel therein could be used responsibly as settlement expanded. A few reserves were made for other purposes. These were for stock shelter and included the trees and bush on the islands in the Waimakariri, Rakaia and Rangitata rivers, reserved for this reason in 1856 (91/56, 3.10.56 Brittan to Superintendent, Land Office Outward Letter Book, 8/2). By 1862 over thirty timber reserves had been designated, though not all were in existence throughout the period. These reserves were located in all the major forest areas of the Province (Figure 2.6), with a concentration on Banks Peninsula.

Through timber licensing, administrators desired to impose order on the Waste Lands of the Crown, to enable the regulated use of the resources thereon in the best interest of, and to the profit of, the

---

8. By 1872 some timber licences were issued, for example see 1250/26.8.72 Provincial Superintendent and Secretarys Inward Letter Book 272/73 (3.3.73) Lands Office Outward Letter Book 8/4, 344/73 Lands Office Outward Letter Book 8/4.

Figure 2.6



Lands Office Letter Books

Provincial Government through a licence fee. The regulations were intended to protect the individual endeavour and enterprise of licensees who had made improvements to their operations.

Forest management by timber licensing and timber reserves failed in several ways. The Timber Agents entrusted with policing duties lacked any means of enforcing the regulations and preventing illegal cutting. The frustrations of the task led to resignations. Ebenezer Hay, Timber Licence Agent for Pigeon Bay wrote that,

> "My motive in resigning is that the trouble is too great and materially interferes with any other business, the trifling commission of 5 percent[9] and the additional expense of paper not compensating for the time to the interests of the Canterbury Association"
> (E Hay to Brittan, 6/6/51, Timber Licence Correspondence)

The Lyttelton Times (25.2.57) made criticism of the timber licensing system and speculated on possible amendments to allow for effective prosecution of offenders. From November 1856 to July 1857 Public Notices were placed in the Lyttelton Times threatening prosecution of illegal cutting continued in Banks Peninsula, Talbot Forest, Harewood Forest and other bushes in the province. Thomas Cass reported instances of illegal cutting[10] on unoccupied lands and in forest reserves to the Waste Lands Board:

---

9. J Knowles who subsequently became the replacement Timber Agent for Pigeon Bay negotiated successfully for a 15 percent Commission (37/52 (4.5.50) Brittan to Knowles Lands Office Outward Letter Book 5/1)

10.

Kaiapoi Bush	1.11.54
Akaroa	21. 2.55
Peel Forest and Waimate Bush	9. 7.57
Islands in the Rakaia	28. 6.63
Le Bons Bay	6. 3.70
North Canterbury	7. 5.72.

> "I must again point out to the Government the great waste and destruction of the timber on the public reserves and waste lands of the Crown, by unauthorized parties, sawyers make a practise of charging extra for cutting on the reserves (at Alford Forest for instance) I suppose in consequence of the risk of prosecution"
>
> (346/26.7.63, Cass to Provincial Secretary Chief Surveyors Outward Letter Book 47/2)

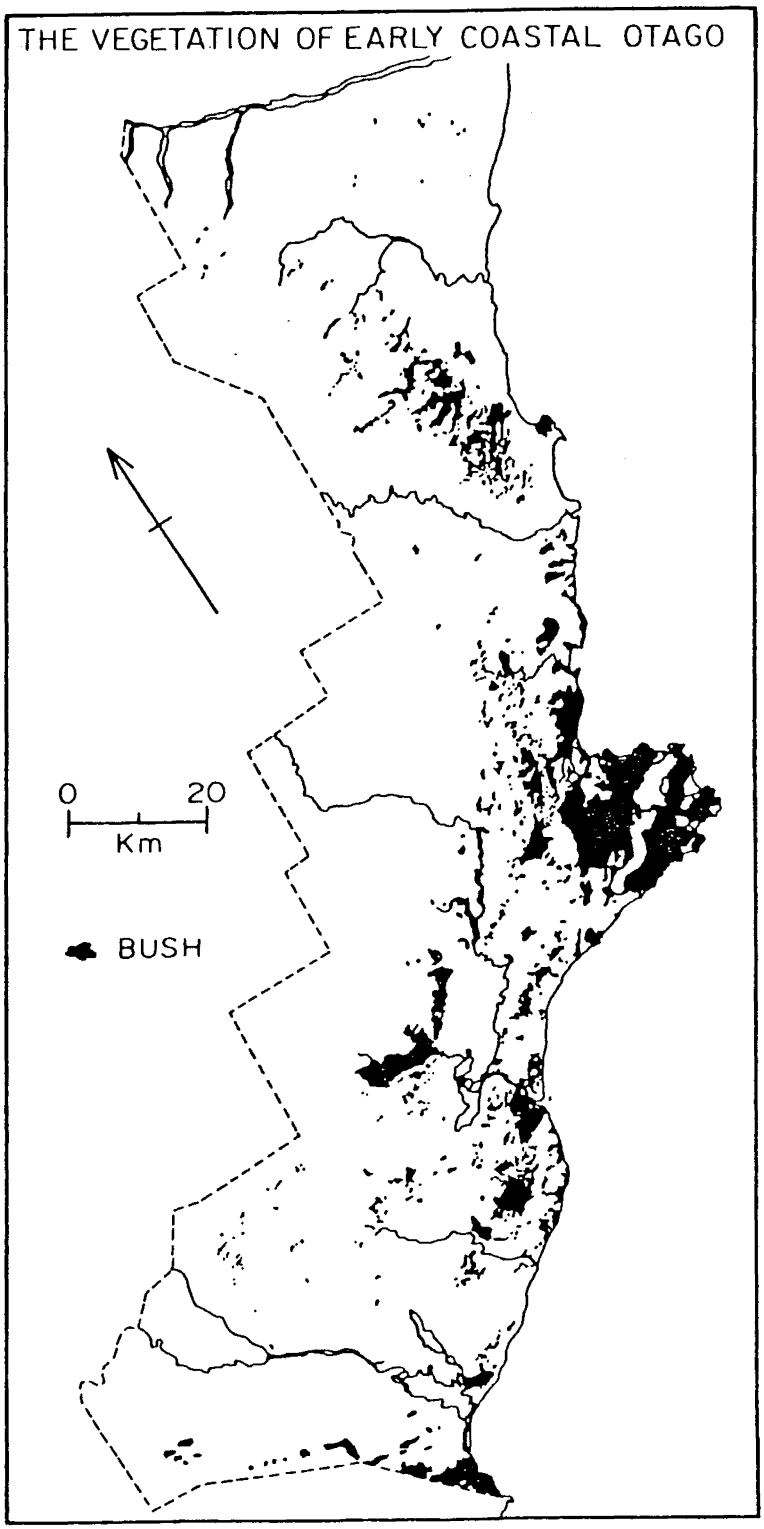
Given the scattered location of the forests and the minimal chance of detection by a government official, much illegal cutting was probably undetected. Fire was also a danger, and there were considerable losses, about 30 000 acres from 1858 to 1868, on Banks Peninsula according to the district Surveyor (AJHR, 1868, D22, 10).

In Canterbury a system of licences and reserves was constituted almost from the arrival of the colonists. The licensing system was based on a single fee and only vaguely defined the areas where forests could be cut. Forest reserves were another feature of efforts to put limited forest lands to their best use. This strategy was a basis of subsequent forest management activity from the 1880s. Probably the dominant feature of timber licensing systems was its failure to achieve regulated use of forest resources. The regulations imposed in Canterbury in the early 1850s were very simple. This limited scope was not their major weakness, rather it was the inability of administrators to enforce the regulations. Consequently illegal and indiscriminate cutting occurred.

2.4.2 Forest Management in Otago

At the time of European settlement in the late 1840s, Otago was 20 percent forested (Allen, 1978). These forests were distributed around the coastal margins (Forrest, 1963) (Figure 2.7) and on the interior uplands. Administrators in Otago faced the same problems of exerting effective control over forest areas as those in Canterbury.

Figure 2.7



Forrest (1963)

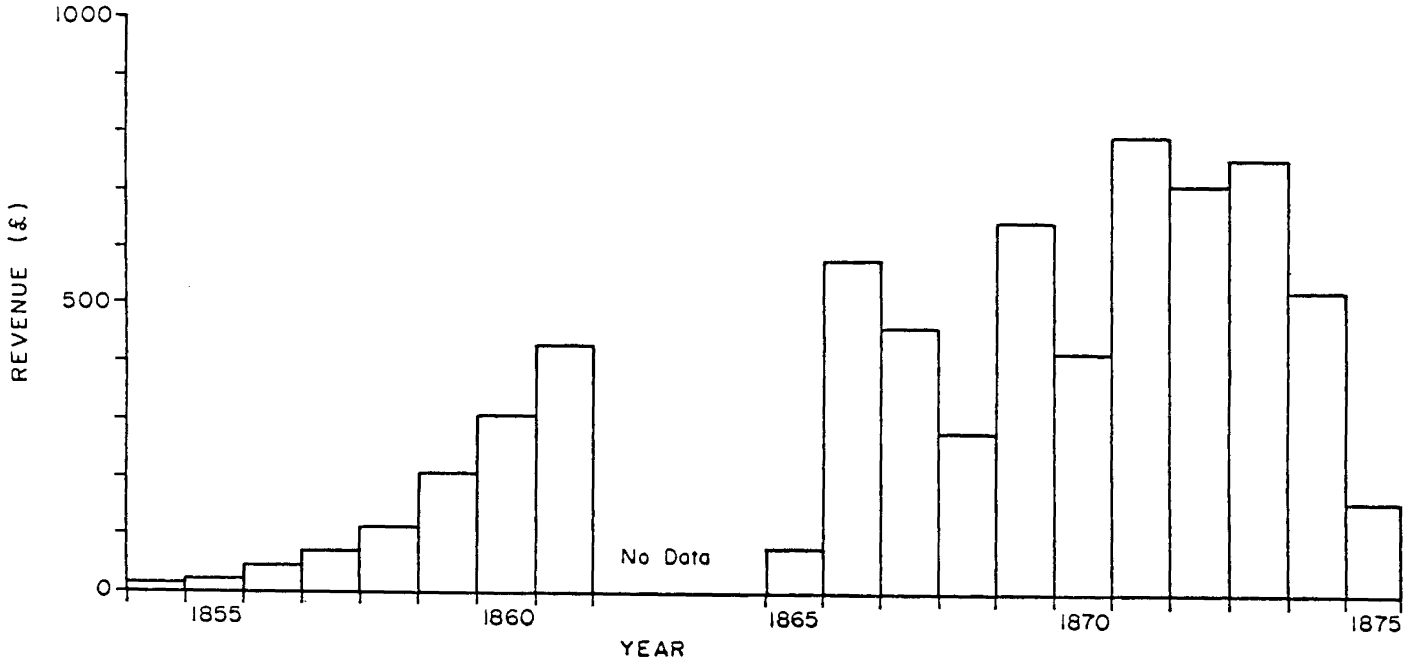
The Otago response to this was positive, to a degree successful, and made possible by the relative importance of the timber industry. Another response was the development of a more sophisticated timber licensing system in an effort to more effectively regulate the trade and secure future supplies.

Faced with the problem of controlling illegal cutting and indiscriminate use of forest lands, the Otago Waste Land Board recommended stricter policing through the appointment of forest rangers. The Superintendent duly raised the matter before the Provincial Council (OPC, 1863, 17, 142). It was proposed to appoint five rangers at £200 per annum to Taieri Bush, Tokomariro in Clutha, North Harbour and Blueskins, Hawksbury and Goodwood, and Moeraki and Otepopo (Figure 2.13). The wages were to be paid from revenue obtained increasing the timber licence fees and from the sale by auction of small sections of bush reserve. The proposal was carried in an amended form. A wage of £200 was considered excessive by some members and arrangements were suggested to make timber licences available from the smaller centres. Only three rangers were appointed. Their duties included inspection of timber reserves, checking the operations of licensed cutters and reporting to the Waste Land Board on sites applied for by timber cutting or saw milling licences. Licences could be issued directly by the Waste Lands Board, but increasingly decisions were delayed pending a ranger's inspection and report on the site.

The pattern in revenue from timber licences and of numbers is from the 1850s to the 1870s, one of growth (Figure 2.8, 2.9). After the mid 1860s in all but two years, revenues were in excess of £500. Correspondingly, there was a growth in the number of licences by nearly one third from the mid 1860s to the 1870s. The pattern is one of steady expansion of the timber industry in Otago. One administrative

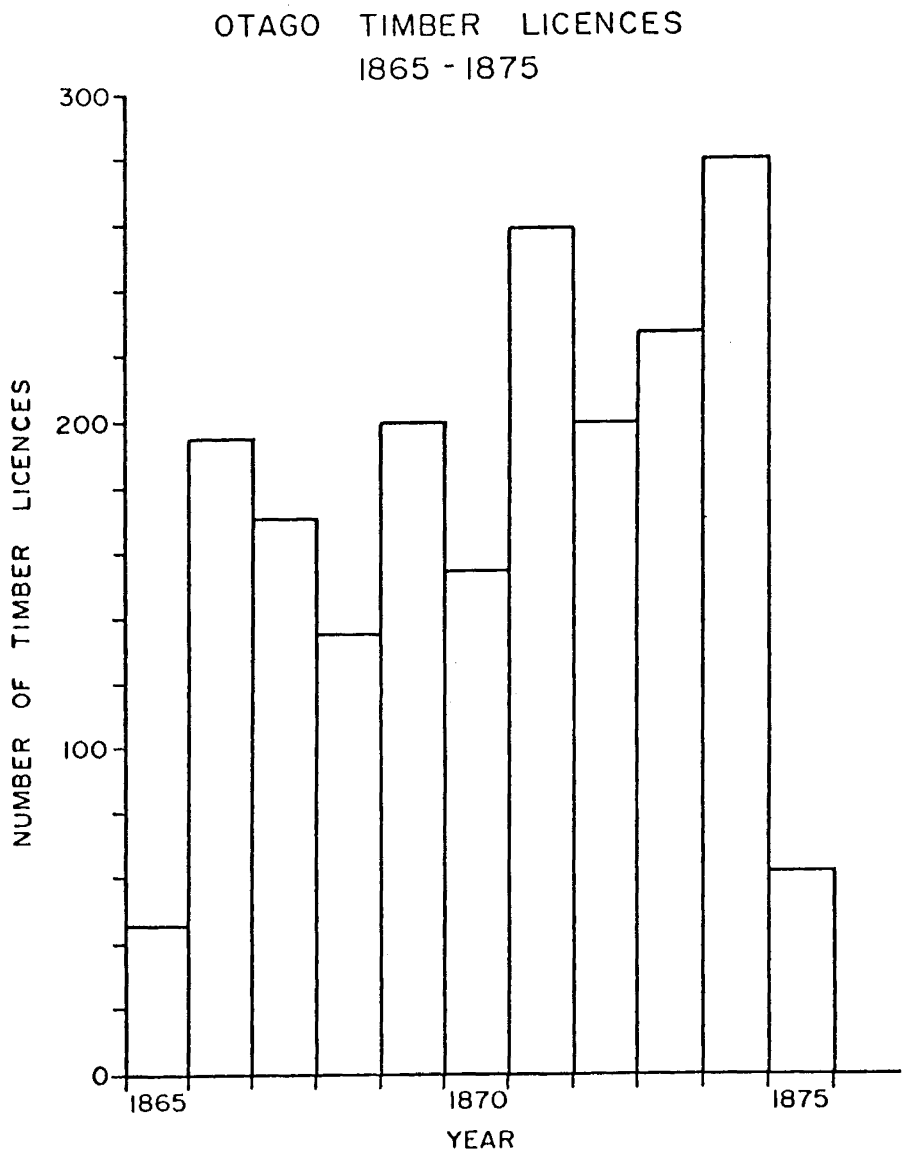
Figure 2.8

REVENUE FROM TIMBER LICENSING IN OTAGO
1854 - 1875



Miscellaneous Fees Cash Book and NZ Statistics

Figure 2.9



Miscellaneous Fees Cash Book

response to the Otago timber industry was to separate timber cutting from saw milling licences. The spatial distribution of all timber licences (including saw milling) is shown by Figure 2.10. At least four clusters are discernable. These include, 1. a north-eastern coastal margin of growing numbers, 2. a central coastal grouping that remains consistently fairly high, 3. a south-western cluster of declining numbers and 4. a western interior of more recent uptake of licences.

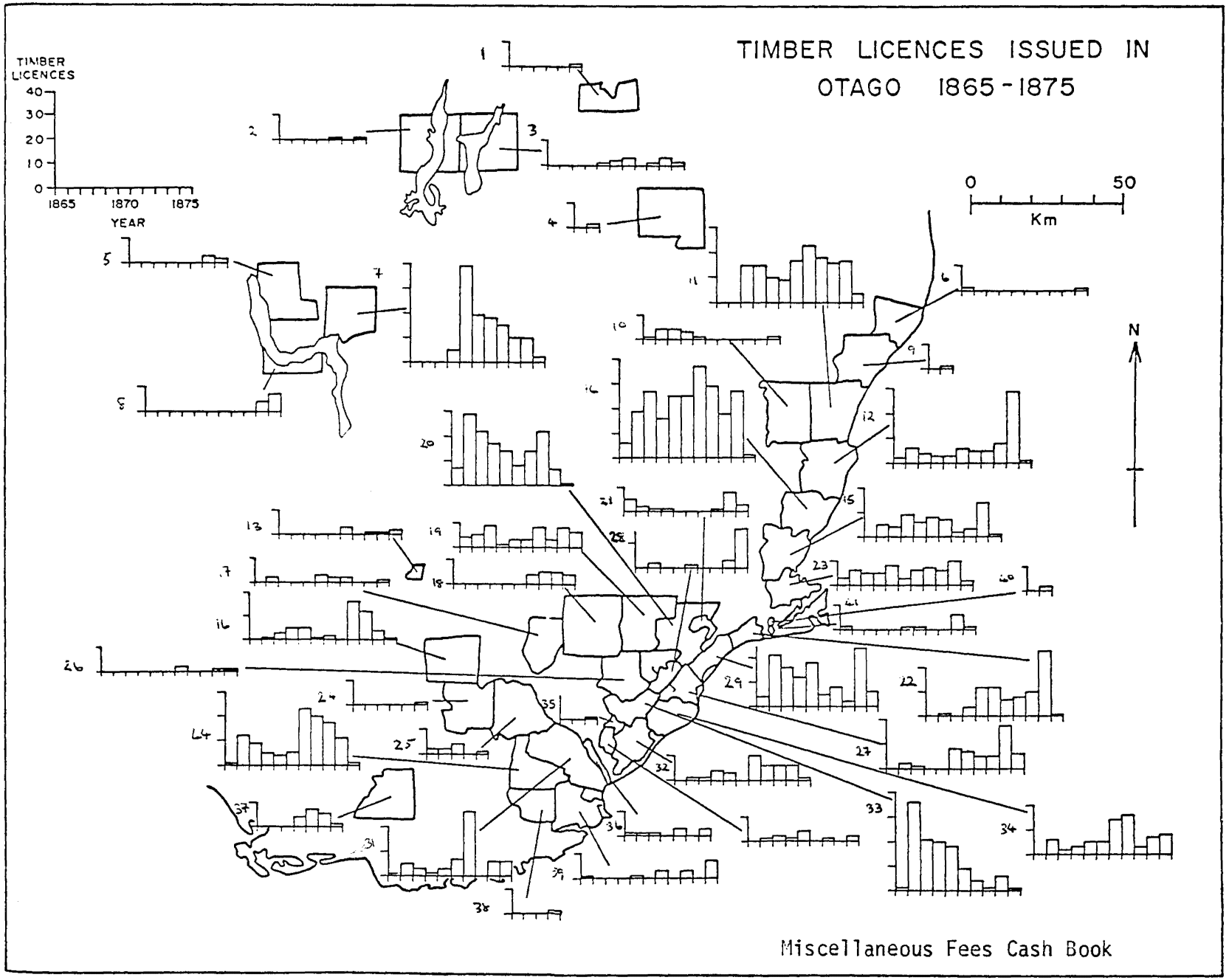
Saw mill licences were issued as a separate, more expensive class of timber licence from 1862. Three phases of developments are apparent in the uptake of saw mill licences (Figure 2.11). There was an initial establishment phase till 1867, when a growth phase which increased the numbers three-fold occurred. This was followed by consolidation and another near doubling in numbers during 1873 and 1874. A fairly small number of companies held many of the licences. Whereas timber licensing occurred primarily on the coastal forest margin this was not the case with saw mill licences. Although a number were concentrated near to Dunedin, some licences were taken up for the inland forests especially around Lake Wakatipu (Figure 2.12).

Timber reserves were also found in Otago where they were designated to protect forest resources for future use as land was opened for settlement. As early as 1852, Walter Mantell the Commissioner of Crown Lands had written to the Colonial Secretary stating that he,

> "deemed it necessary to reserve the land between Big Kuri and Kuri Bushes was (sic) in order to preserve the wood from further destruction"
>
> (Mantell to Colonial Secretary, 17.5.52, Crown Lands Outwards Letter Book)

By 1867 over 27 timber reserves totalling 61 200 acres had been designated (Figure 2.13). Most of the timber reserves were from one to

Figure 2.10


TIMBER LICENCES ISSUED IN OTAGO 1865-1875
TIMBER LICENCES
40
30
20
10
0
1865
1870
1875
YEAR
0
50
Km
N
Miscellaneous Fees Cash Book

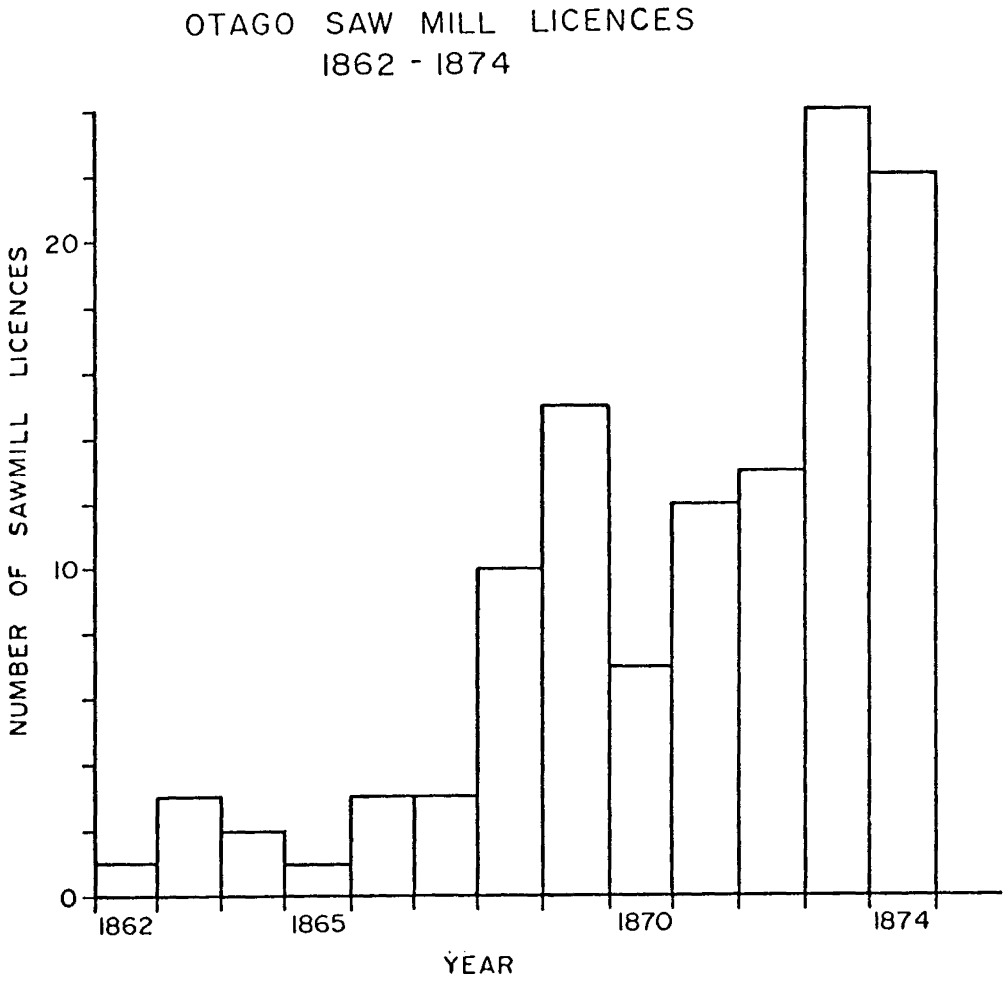
TIMBER LICENCES[1] IN OTAGO 1865-1875

No	Survey District	No	Survey District[2]
1	Lake Ohau	22	Dunedin and East Taieri
2	Mid Wanaka	23	North Harbour and Blueskins
3	Mid Hawea	24	Waipahi
4	Gala	25	Pomohaka
5	Glenorchy	26	Table Hill
6	Papakaio	27	Clarendon
7	Shotover	28	Waihola
8	Mid Wakatipu	29	Otokio
9	Oamaru	30	Warepa
10	Waihemo	31	Clutha
11	Otepopo	32	Kaitangita
12	Moeraki	33	Tokomariro
13	Waikaia	34	Akatore
14	Hawksbury	35	North Tuakitote
15	Waikouaiti	36	Inch Clutha
16	Glenkenich	37	Wyndham
17	Tuapeka West	38	Catlins
18	Tuapeka East	39	Glenomaru
19	Waipori	40	Waikari
20	Maungatua	41	Upper Kaikorai
21	West Taieri		

Notes:

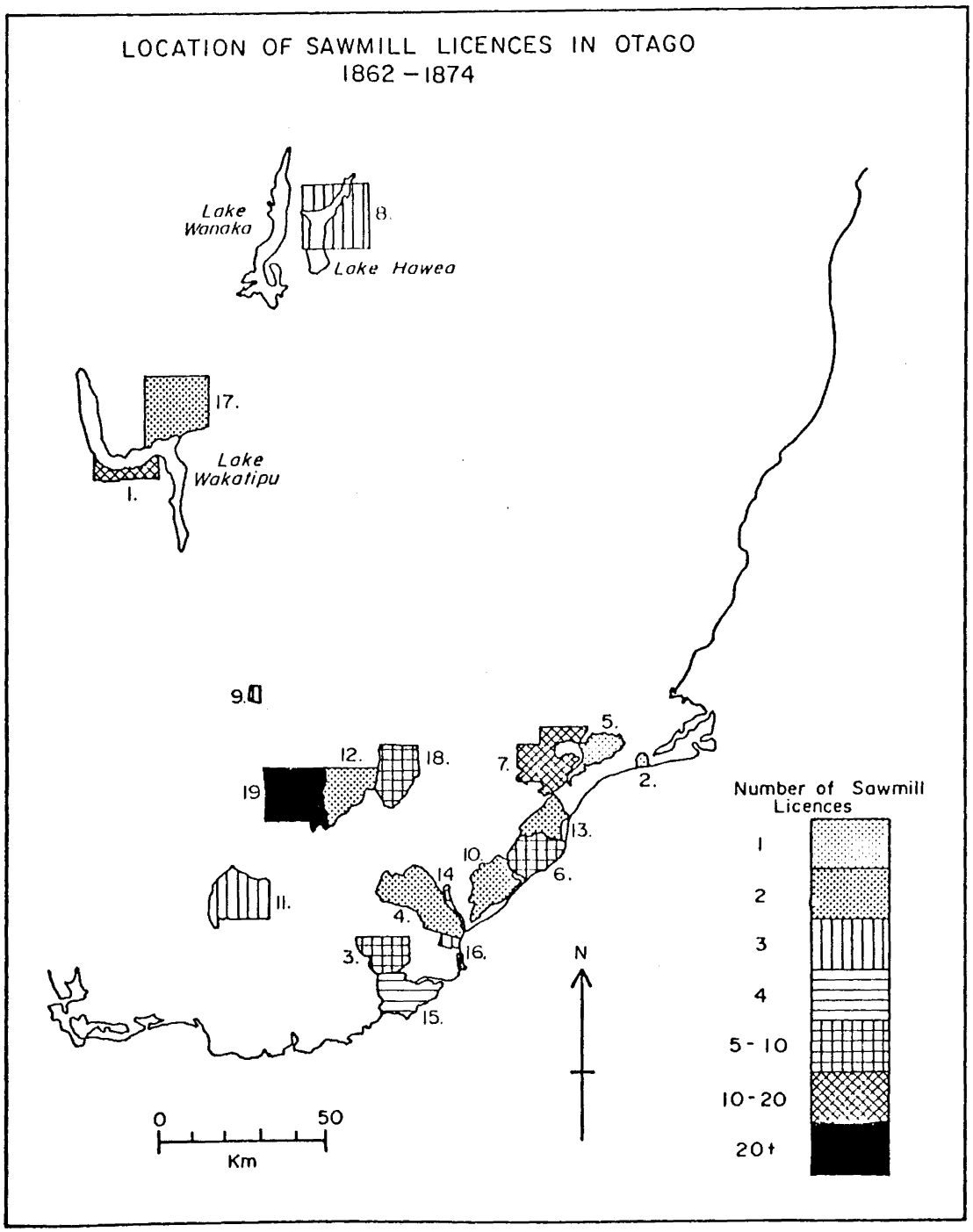
1. Includes both Hand cutting and Sawmilling licences
2. The Survey Districts slightly postdate the issue of timber licences thus the locations are only approximate.

Figure 2.11



Miscellaneous Fees Cash Book

Figure 2.12



Miscellaneous Fees Cash Book

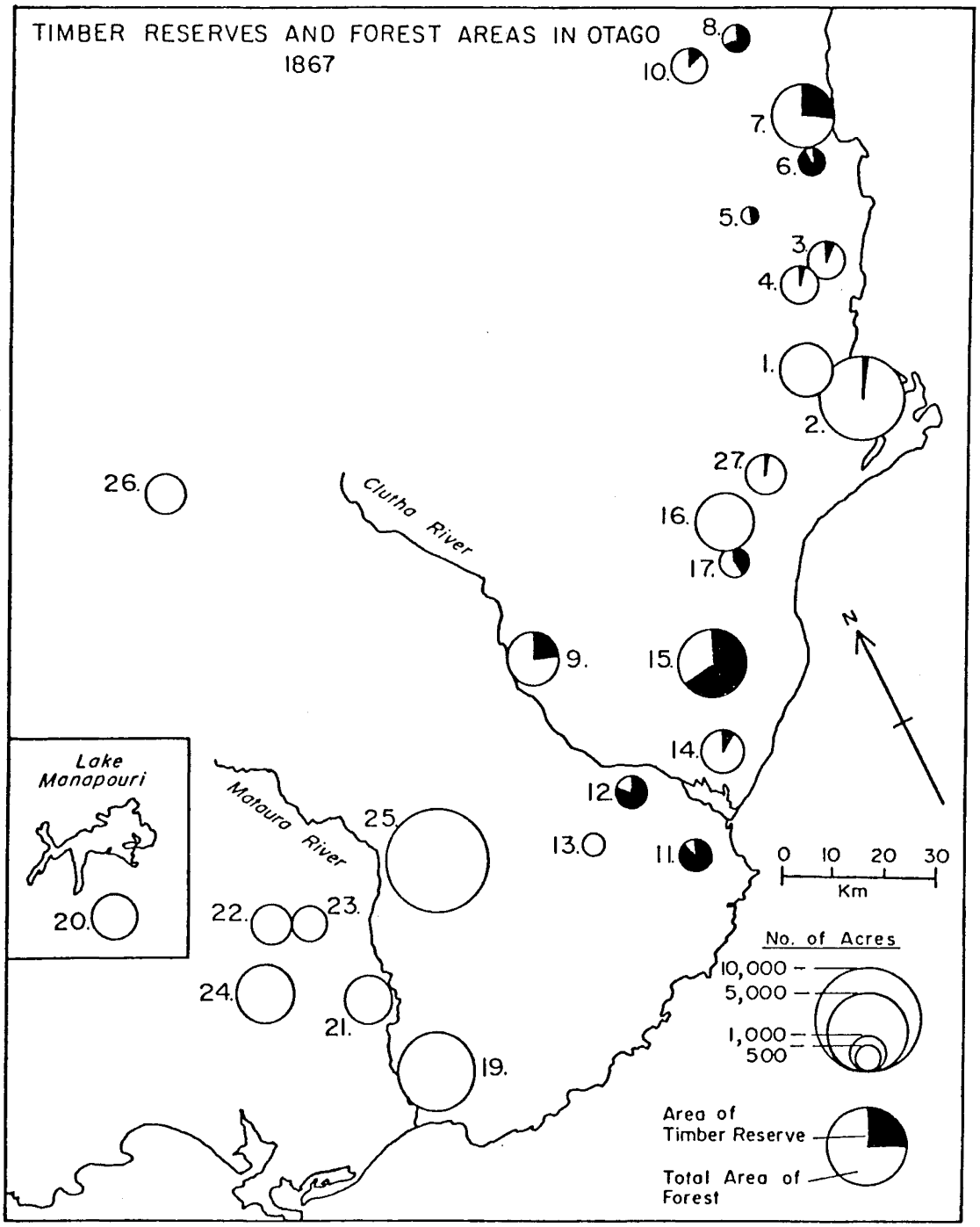
LOCATION OF SAWMILL LICENCES IN OTAGO 1862-1874

No.	Location[1.]
1	Wakatipu
2	Waikari
3	Catlins
4	Clutha
5	East Taieri
6	Akatore
7	Maungatau
8	Hawea
9	Waikaia
10	Kaitangita
11	Tututrau
12	Rankleburn
13	Clarendon
14	Glenomaru
15	Woodland
16	South Molyneaux
17	Shotover
18	Tuapeaka West
19	Glenkenich

Notes:

1. The boundaries are taken off the survey districts and slightly postdate the issue of the saw mill licences, thus the locations are only approximate.

Figure 2.13



OPC, Return of area and position of bushlands

TIMBER RESERVES AND FOREST AREAS IN OTAGO 1867

No.	Location
1	Silver Peak
2	Blueskin
3	Hawksbury
4.	Goodwood
5	Puketapu
6	Moeraki
7	Kuri
8	Otepopo
9	Waitahuna
10	Kauru
11	Glenomaru
12	Warepa
13	Kaihiku and Moa Hill
14	Kaitangata and Mt Misery
15	Tokomariro to Taieri
16	Waipori
17	Maungatua
18	Taieri Gorge
19	Toetoes
20	Titiroa
21	Mokoreta
22	Miminau
23	Tuturau
24	Slopedown Range
25	Tapanui
26	Umbrella Range
27	Taieri to Waikarai

one and a half square miles in area (640 to 960 acres). This portion, estimated as sufficient to meet the future needs of the community was reserved. The remainder of the forests were to be utilized immediately and eventually turned to other landuses.

However, there were signs that some of the public felt that local timber supplies were threatened and that more effective use should be made of forest resources. In 1869 the Queenstown Town Council passed a resolution,

> "recommending that timber under 10 inches diameter be reserved and that no more timber leases be granted on the shores of the Lake, or in the event of granting of such leases being continued to give due publicity through the local journal."
>
> (Otago WLB Minutes, 12.5.69)

This was drawn to the attention of the Otago Waste Lands Board. To place the Town Councils concern in perspective, the mill belonging to J W Robertson and Company at Lake Wakatipu cut out 1 600 acres of forest in 10 years (AJHR, 1874, H5, 17). The Council's resolution is interesting in that it attempted to reduce indiscriminate cutting by a diameter limitation to protect immature trees. The original timber licensing schemes placed no limitations on what could be cut.

The approach to forest management in Otago although originating from a similar basis to that of Canterbury developed along more comprehensive lines. Efforts were made to more efficiently police the use of the forest resource. In part this is perhaps a legacy of arboratorial traditions developed in Scotland and the greater extent and economic importance of forests in Otago than Canterbury. It was not simply a matter of larger forests being more economically important and giving rise to additional regulation, for in the abundantly forested North Island a mucn different attitude to forest management emerged.

2.4.3 Forest Management in Hawkes Bay

The attitudes towards forests held by administrators and politicians in Hawkes Bay are indicative of the wider values of North Island bush settlement where the forest was a barrier to be conquered. It is somewhat paradoxical that a belief in superabundant forest resources existing only to be exploited, and then by alienation rather than the Crown licence, was fostered in a province which by North Island standards was scantily forested.

A Select Committee of the Provincial Council of Hawkes Bay reported in 1864, that there were no regulations allowing the issue of timber licences. However, a clause in the Additional Land Regulations of the Province of Wellington (1855) which was extended to include Hawkes Bay did allow for reserves of timber on special settlement lands. These reserves were for the use of the settlers. The Select Committee was of the opinion that,

> "great damage would be sustained by the Province if licences were granted to cut timber on the Bushlands of the Crown, and the expense of overlooking such a system would be very great"
>
> (Report of the Commission on Bush Contained on Crown Lands, HBPC Session VII and VIII, 1864, not printed)

The potential damage and the cost of timber licences were regarded as sufficient to cause the Select Committee to recommend against their introduction and to urge that the penalties for illegal cutting under the Crown Lands Act of 1862[11] be advertised in the Gazette.

Later in 1864 a second Select Committee was convened to report on the "State of the Province as Regards Timber". The report claimed that,

---

11. Repayment at a maximum rate of £40 an acre with an additional fine of up to £2 for each tree cut of over 30 inches girth.

> "there is ample evidence of very large and almost inexhaustible quantities of superior building timbers in this Province, which, in several forests, grow to an unusual size, and are very valuable although, at present from want of road, difficult if not impossible to bring to market."
> (HBPC, Votes and Proceedings, Session VII and VIII, 1864, Council Paper, p 3)

Even in Hawkes Bay, one of the less forested regions of the North Island, forest resources were regarded as super-abundant. Consequently, concern was raised over the relative inaccessibility of the forest resource because of poor communications. Improved roading was considered essential in view of "such a great demand for all such timber" (HBPC Votes and Proceedings, Session VII and VIII, 1864, Council Paper, p 3).

The select committee was advocating use of the resource. To achieve increased exploitation, but without the wastage and costs of a timber licensing system, the committee proposed to alienate forest lands. A slight increase in the upset price was to pay for the cost of construction of road links. The underlying premise, of protection and wise use of the forest resource through its alienation, was prevalent throughout much of New Zealand. It was argued that private ownership would produce efficient use because it was in the holders' best interests to maximise their returns. Some division of the forest lands into small lots suitable for those engaged in wood cutting was also envisaged.

The attitudes of the Hawkes Bay politicians are significant for the insights that they reveal. The forest resource base was regarded as almost inexhaustible and official and popular attention was focussed upon its increased exploitation or development. However, these administrators were conscious of waste and illegal cutting as occurred because of the difficulties of control under timber licensing systems. Instead they adopted an approach which reflected a wider laissez-faire response to resource allocation problems. Through alienation of forest

land, administrators sought to minimise waste and illegal cutting as well as achieve efficient usage.

2.4.4 Forest Management in Auckland

In Auckland Province the timber industry was an early and economically significant development (Stokes, 1966, Stone, 1973). However, data on the amount of revenue from and areas held under timber licences, for later in the Provincial period reveals only small sums were collected (Figure 2.14, 2.15). The major developments in the timber industry occurred on freehold lands. On Crown land, the maximum revenue was obtained from timber licensing in 1873 and corresponds to an increasing acreage. This may indicate a growth in small scale hand-cutting and sawing activity.

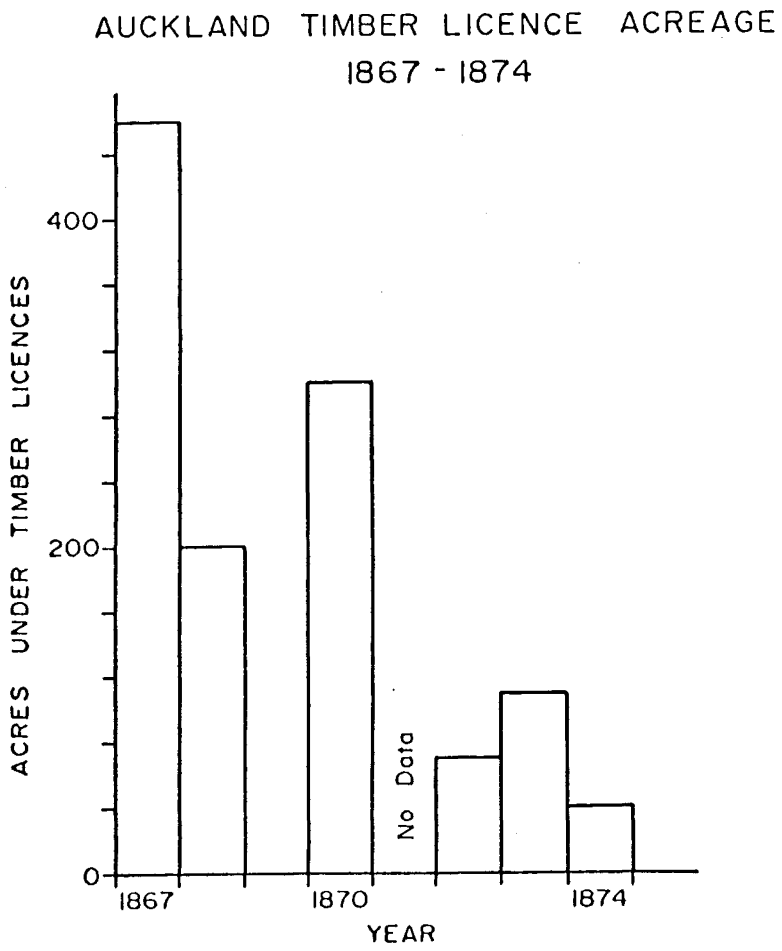
Timber licensing in Auckland Province was marred by problems such as waste and illegal cutting faced in other parts of New Zealand. Another general problem was one caused by only broadly defined boundaries. One consequence of this was cutting on the wrong site. An Auckland example of what was a wider problem was reported by the Resident Magistrate at Monganui to the Provincial Superintendent:

> "I found that Mr Jackson had been mistaken as to the exact position of the Gully. This mistake, I found was quite natural the formation of the Land being so similar and all trace of survey line lost in consequence of the length of time since they had been cut; as I had purchased the land from the Natives I was better able to identify the spot."
>
> (Resident Magistrate to Superintendent, 1475/74, 27.1.74, Provincial Superintendent Inwards Correspondence)

Deliberate rather than accidental illegal cutting was more of a problem. By December 1873 the situation was sufficiently serious for the Superintendent to place a notice in the Gazette:

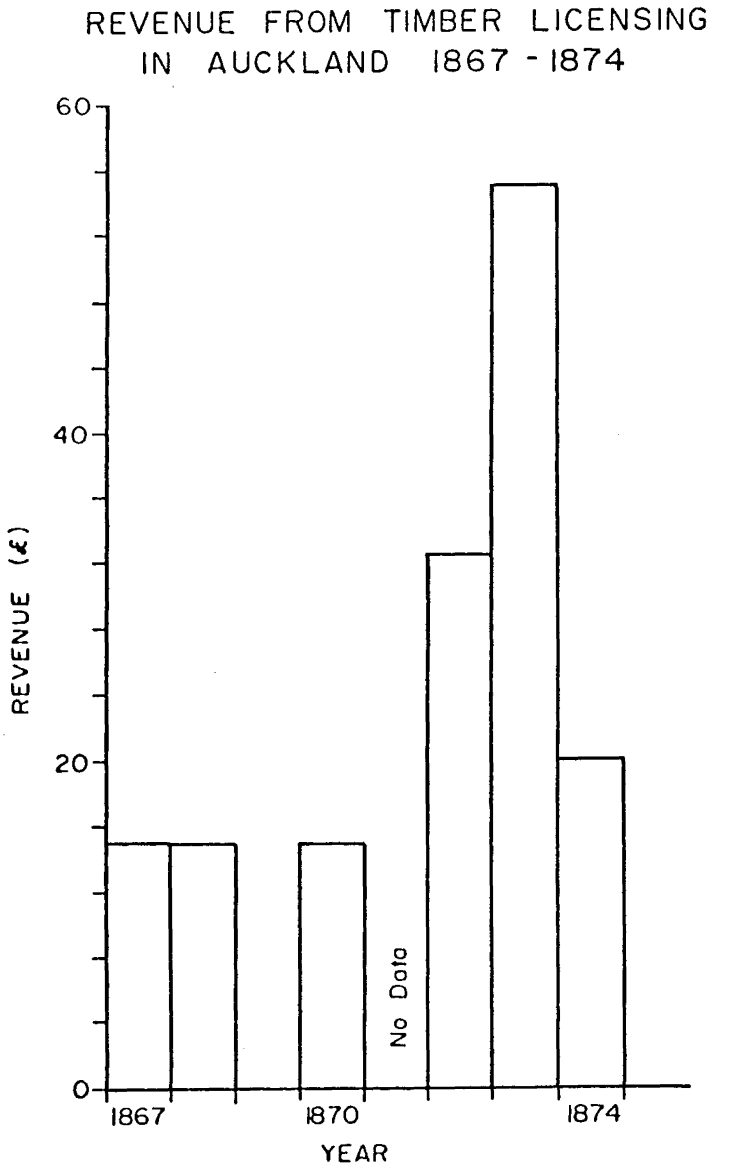
> "all persons were warned not to damage, cut, fell, remove, therefrom any timber or underwood of any kind whatsoever growing, standing or lying upon the public lands of the said Province of Auckland"
>
> (New Zealand Gazette, 50, 8.12.73, p 301)

Figure 2.14



NZ Statistics

Figure 2.15



NZ Statistics

Prosecution under the Crown Lands Act, 1862 was threatened and the Highway Boards were requested to aid in enforcement. On the same day another notice appeared warning the public not to "cut, fell, or remove, or contract" for any timber on Maori lands where the land title had not been determined by the Maori Land Court or on lands which the Government had entered into over purchase agreements. The problem of forest management and Maori lands was a peculiarly Auckland and typically North Island problem.

Some idea of the extent of illegal cutting on Maori lands is gained from Figure 2.16 which maps the location of complaints laid before the Provincial Superintendent. These occurred throughout the province but were concentrated in the Northern extremities. As this map is based on complaints laid, it under-estimates the real extent of illegal cutting for not all offences would have been detected nor drawn to the Superintendent's notice. However, the Superintendent's attempts to stop illegal felling by forbidding all Europeans to cut timber on Maori land unless the title had been settled was greeted with a mixed reaction by the land owners. In letters of disapproval a justifiable resentment of European pronouncements over how owners should utilize their lands, is evident. Te Haeru wrote to the Superintendent:

> "I have seen it the public notice and I understand it. It is enough, my word to you is this. I do not approve of this law for our lands with us alone is the control of our lands" (Te Haeru to Superintendent, 225/74, Provincial Superintendent Inwards Correspondence)[12]

Others had entered into agreements with timber cutters and did not wish to break their word:

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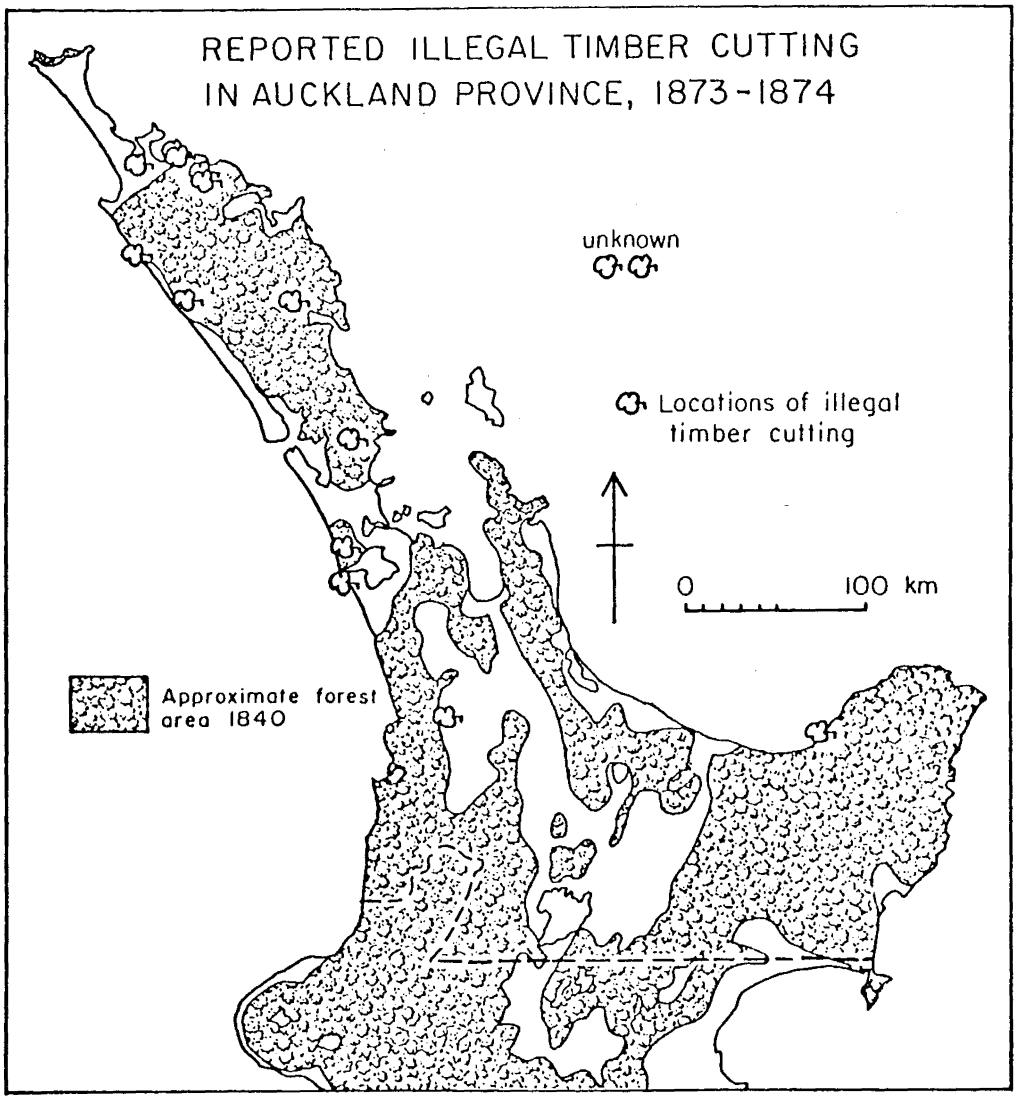
12. See also Moetau to Superintendent, 272/74, 16.1.74, Provincial Superintendents Inwards Correspondence. The original letters are in Maori and accompanied by a translation.

Figure 2.16



Superintendents Correspondence

> "the timberlands which I have let to the pakehas by word of mouth ... the payment has been received by such, and I will not depart from any arrangement, nor will I alter my previous thoughts until the termination of the period agreed upon for the pieces."
> (Kikipa to Superintendent, 272/74, 16.1.74, Provincial Superintendent's Inwards Correspondence)

In other instances the Superintendent's proclamation was favourably received. Te Matetahi drew attention to the damage caused by timber cutters in his reply to the Superintendent:

> "I agree with your words this time. Particularly the pakeha who are now working in the pieces of Maori Land not surveyed ... the cultivations of the natives here were destroyed, the fences broken by the timber (cutters)."
> (Matetahi to Superintendent, 315/74, 20.1.74, Provincial Superintendent's Inwards Correspondence)

The reaction of the same settlers to the Superintendent's proclamation was negative. They felt that a basic requirement was being denied them. The Chairman of the Kirikiria Highway Board expressed his concerns to the Superintendent in the following way:

> "There is a vague fear and a great deal of anger raised by the same ... It is readily conceded that it is high time the valuable timber of the country was protected, but it can hardly be intended to prohibit the small bona fide squatter and townsman from cutting small fencing and firewood such as what they cannot absolutely live in the district ... I feel assured that timber - not scrub - stuff only fit for the use of firing and fencing was intended"
> (Chairman Kirikiria Highway Board to Superintendent, 1311/74, 25.4.74, Provincial Superintendents Inwards Correspondence)

The Chairman of the Highway Board expressed a point of view emphasising utilization but making a lip service concession to resource conservation, even though he asserted that local circumstances demanded a different approach.

Canterbury, Otago, Hawkes Bay and Auckland display varying levels of sophistication in dealing with forest management within a licensing and reserves structure. The problems encountered were also different. In the North Island, bush farming goals and a wide-spread belief in inexhaustible forest resources led to reduced use of timber licensing

and reserves. In the South Island, with the exception of Westland, there were greater pressures upon the accessible and less extensive forests. Much South Island forest was on Crown rather than Maori or freehold land. Timber licensing and its more specialised offshoots consequently took a greater hold in the South Island. This system of forest management was limited in intent and, equally importantly, faced growing difficulties in its effective operation by the 1870s.

2.5 TIMBER LICENSING AND TIMBER RESERVES: PERIOD VIEWS AND A CONCEPTUAL APPROACH

Timber licensing and timber reserves, as systems of forest management, had limited aims: to regulate the use of forest lands. This in itself was not a viewpoint from which a more comprehensive approach to forest management was likely to emerge. However, immediate dissatisfaction was with the inability to administrators to police the regulations. Control over the use of forest resources on Crown Lands was lacking and in consequence wasteful use abounded.

Some idea of the state of New Zealand forests and their management may be gained from two papers tabled in the House of Representatives and entitled Correspondence Relative to the Present Condition of the Forests of New Zealand (AJHR, 1869, D22) and Papers relating to State Forests in New Zealand (AJHR, 1874, H5). A more comprehensive approach to forest management, extending beyond mere regulation of the levels to embrace State protection and production forestry, was the motivation behind these two documents. These intentions are discussed fully in Chapter III, which traces the first moves towards comprehensive national forest management. In their content, however, these two tabled papers provide a summary of the state of timber licensing and timber reserves after the system had been in operation for nearly two decades. They provide useful insights into,

1. the extent of the forest resource
2. the strengths and weaknesses of timber licensing systems
3. period suggestions for the improvement of forest management.

Behind these substantive details, an important distinction may be drawn between the **apportioning** of costs and benefits, which allows a more rigorous conceptual insight into the timber licensing and timber reserves system. Both timber licensing and timber reserves changed the nature of the property rights associated with forested Crown land. Hearn (1982) has discussed related issues effecting water rights in late nineteenth and early twentieth century New Zealand.

All types of property rights confer certain costs and benefits to the holders. Desmetz (1967) has discussed changing property rights, from an economist's perspective, in terms of "externalities". These are defined as the external costs and benefits accruing beyond the parties involved in any transaction. There is also a tendency to bring costs to bear upon those parties benefiting from a transaction, these may be described as "internalities". The example of the development of hunting rights amongst the Motagne Indians in North America was interpreted by Desmetz in terms of a changing disposition of costs and benefits as more explicit property rights developed. Timber policy and property rights in the north western United States of America have been assessed by Libecap and Johnston (1979), but they were more concerned with explaining why illegal activities occurred. The externalities argument used by Desmetz does not appear to have been utilized in the forest history context. Yet sufficient parallels exist between the development of hunting rights and changes in forest management to suggest that this approach would add to an understanding of New Zealand developments.

2.5.1 The Forest Resource in 1868

The estimated forest area in each Province in 1868 is summarized in Table 2.7. The acreages cited are, however, only approximations as is evidenced by the use of rounded off figures. Some replies from Provincial Superintendents were obviously more considered than others. Even so, some broad regional patterns are discernible: the lower North Island, upper South Island and Westland districts appear as the most heavily forested areas. Much of the South Island forest was on mountainous slopes and inaccessible to a timber industry.

The attitudes revealed in assessments of forest resources shown in Table 2.7 are also interesting. They reveal that in some areas forest supplies were regarded as inexhaustible, although it is important to note that exceptions existed. In Canterbury and Otago only a few years supply of indigenous timbers were thought to remain. The comments of one of the Otago Forest Rangers clearly illustrated a rejection of the idea of super-abundant resources:

> "The magnificent forests of America and India which at one time were supposed to be inexhaustible are disappearing rapidly and according to recent accounts the scarcity of timber is already being felt"
> (AJHR, 1874, H5, 18)

Relating this situation to Otago the same ranger observed that the forest resources of the Province, while considerable, were suffering from "rapid destruction" and given the likely increase in population new measures were necessary:

> "it is of the utmost importance to the community to have existing forests protected from the reckless extravagance which is prevalent in the province"
> (AJHR, 1874, 175, 18)

This remark was made in one of the two provinces, the other being Southland, that made efforts to effectively police the operation of the timber licensing system.

Table 2.7

OFFICIAL APPRAISAL OF FOREST RESOURCES CIRCA 1868

Province	Forest Area acres	Percent	Qualitative Assessment
Auckland	1 650 000	10	considerable in some areas
Taranaki	1 800 000	83	"super-abundance"
Hawkes Bay	360 000[1.]	12	-
Wellington	4 506 000	57	-
Nelson	3 000 000	36	"large acreage"
Marlborough	700 000	26	"enormous extent of timber land"
Westland	2 000 000	63	extensive
Canterbury	270 000	3	3-5 years milling supplies on Banks Peninsula
Otago	1 421 000	13	6-50 years depending on locality
Southland	766 000		about 400 years supplies

Compiled: AJHR, 1869, D22, 1874, H5.

Notes:

1. Only 95 000 were considered Merchantable timber.

2.5.2 Strengths and Weaknesses of Timber Licensing and Timber Reserves

Dissatisfaction with timber licensing and timber reserves was quite evident by 1868. There was a general concensus amongst the Provincial Superintendents that timber licensing and timber reserves were wasteful and in ill-advised means of forest management (Table 2.8).

Four Provinces had never granted timber licences. In the cases of Wellington, Westland and Taranaki this was because of the regional abundance of timber so that there was no need to ration forest resources. Hawkes Bay lacked the appropriate legislation to issue timber licences and apprehensions about the difficulties of operating such a system prevented its introduction. Only in Marlborough and Nelson, where the Superintendents assessed the forest as abundant, was timber licensing considered not to lead to extravagant waste. In these two Provinces the maximum area was limited to ten acres and only a few licences had been issued. The small areas and numbers involved may explain the satisfaction with timber licensing.

The remaining four provinces; Auckland, Canterbury, Otago and Southland, were highly critical of timber licences. "They give men the right to go anywhere through the forest," wrote the Superintendent of Canterbury,

> "and to cut and destroy any quantity of timber. Having no permanent interest in the soil they look only to the present and often destroy as much valuable timber as they bring onto the market. The revenue derived from this source is quite insignificant."
> (AJHR, 1869, D22, 9)

The Inspector of Forests for Southland was of a similar opinion with regard to the effect of licences. However, he distinguished between the impact of hand sawyers and saw millers. The low capital investment and transcient nature of hand timber cutting led, he believed, to indiscriminate cutting. In contrast, the saw miller with a heavy capital investment in plant and the expense of building a tramway or

Table 2.8

RESPONSES OF PROVINCIAL SUPERINTENDENTS TO TIMBER RESERVES AND TIMBER LICENSING

Province	Timber licences as cause of extravagant waste	In favour of timber reserves
Auckland	Yes	No overall[1].
Taranaki	None granted	Yes, for Mount Egmont
Hawkes Bay	None granted	Yes, for larger forests
Wellington	None granted	No
Nelson	No, but would not recommend issue	Yes, for mountain ranges and heads of streams
Marlborough	No	-
Westland	None granted	No
Canterbury	Yes	No
Otago	Yes	No, except for small areas
Southland	Yes	No, except in thinly forested areas

Source: AJHR, 1869, D22.

Notes:

1. This is Hector's assessment, a count of the returns indicates that the highway boards were evenly split over the question of timber licensing.

road was more likely to attempt to prevent losses through fires and wastage. By acting in his own interests the saw miller was considered to be benefiting the public good.

Timber reserves were regarded in an equally negative light. In Otago they were viewed as a concession to timber requirements of the settlers in the vicinity. Even so, it was felt that this would lead to their inevitable "early destruction". Timber reserves were also supported in Taranaki and Nelson, but for quite different motives. It was suggested that all forest within a ten mile radius of Mount Egmont should be reserved. Similarly in Nelson Province it was considered desirable to make reserves in the mountain ranges and headwaters of streams. The rationale here was not to protect timber supplies but to retard the effect of flooding which had already been felt in Nelson township. This was a fundamentally different reason for reservation than those encountered earlier. Rather than protection of the standing timber, the reserve was intended to provide secondary benefits by way of flood protection. The nearest precedent for reserving forest for other uses lay in the stock shelter reserves of Canterbury.

The first signs of environmental degradation such as flooding resulting from improvident use of the forest resource were beginning to be felt by the 1860s. But, on the whole, cause and effect were not associated nor was a need for action felt by administrators other than by reacting with engineering works such as stop banking. Generally, however, timber reserves were not favoured. The Superintendent of Canterbury based this view on the lack of effective control:

> "It is impossible to exercise any effective supervision over them and the law does not appear to afford any sufficient protection. It has been difficult to procure convictions for unlicensed cuttings. I am decidedly of the opinion that forest should be allowed to pass into freehold as the only chance of their ultimate preservation"
> (AJHR, 1869, D22, 9)

This latter suggestion of protection through alienation was an important response in the nineteenth century.

Suggestions for the improvement of forest management practises by tightening existing structures or modifying them significantly were also voiced. The Superintendent of Southland claimed that the appointment of a Forest Ranger during the 1860s would have saved the Province much wastage of timber. Effective control was the key issue to a workable system of timber licensing. However, to focus entirely upon control of forest resources tends to minimise some of the inherent weaknesses of licensing with regard to vaguely defined areas and wasteful use. One of the Otago Forest Rangers observed that, under the existing system,

> "No regulations however rigorous, and no staff of officials no matter how zealous in the execution of their duty, can control to any practical extent the wasteful destruction of timber"
>
> (AJHR, 1874, H5, 12-13)

All quality timber tended to be cut within the first two years. Many immature trees were also taken and felling was often wasteful, with three foot high stumps and tops left, the latter became a fire hazard when dry.

Forest Ranger Innes from Otago recommended several modifications to timber licensing to make it more effective. Firstly, he believed that, the public should be excluded from Crown forests and, secondly, that standing timber should be sold by auction. This latter suggestion would change the basis of timber cutting rights from blanket access to an area to the competitive purchase of the rights to standing trees. Clearly Innes hoped that by auctioning cutting rights to standing timber efficiency would be increased. He also pressed for the revision of felling practises. Ground level cutting of trunks was desired as was the removal of branches and other wood debris. Innes acknowledged

that his suggestions were based upon those used for Pine forest management in Scotland.

Forest Ranger Innes also advocated new directions for forest management to provide "a perpetual source of timber" (AJHR, 1874, H5, 40) and reduce waste. This represented a considerable advance upon the goals of timber licensing and timber reserves, which were primarily concerned with regulating use. Innes was suggesting forestry as a permanent rather than transitional landuse and not a single crop. In reaching this assessment he doubtless drew on his Scottish experience, although this was probably influenced by his perception of the limited accessible timber supplies remaining in Otago.

Innes suggested the demarcation of blocks of trees, leaving a protective outer margin, and within felling individual units on a rotational basis, so that natural regeneration or replanting would allow them to mature by the time the original section was returned to. Three advantages were claimed:

> "If this system of felling the timber in its natural state were adopted, not one single tree or branch would be wasted or destroyed, the public would be supplied at as reasonable rate as they are at present, and the supervision would be simplified."
>
> (AJHR, 1874, H5, 20)

Innes' suggestions foreshadowed initiatives at the national level during the 1870s (see Chapter III).

Indigenous tree species had proved difficult to propogate, were fairly slow growing, and did not always regenerate easily. For these reasons and possibly because of a greater confidence in known species Innes favoured replanting in Scots Pine and with Australian Eucalyptus species. The two other Otago Forest Rangers also advocated replanting as a solution to future timber supply problems. They favoured financial incentives or land grants to encourage tree planting. This idea was not new, one of the recommendations of the Report on the Conference

on Agriculture (OPC, 1868, Council Paper No. 3) supported tax exemptions and land grants for private tree planting. The Otago Waste Lands Act, 1872 incorporated provisions for tree planting under clause 169, but little use was made of this provision.

Afforestation was also regarded as a means of securing future supplies on the tussock grasslands of the Canterbury Plains. However, it fairly quickly became apparent that the secondary benefits of plantations as shelterbelts for agriculture were considerable and this motive dominated future efforts. A Provincial Council Planting of Trees Ordinance of 1858 indicates the rapid acceptance of afforestation arguments in Canterbury. The Ordinance was intended to "encourage and promote the planting of forest trees on rural sections" (CPC, 1858, Ordinances, Session X). Renewed and more comprehensive steps were taken in the 1870s. A committee was appointed in 1870 to report on the best means of promoting the establishment of new industries in Canterbury. Amongst its recommendations was the suggestion that trees be planted on the plains for timber, to serve as shelterbelts and help ameliorate the climate.

The Joint Committee on Colonial Industries (AJHR, 1870, F1) made similar proposals to Parliament regarding tree planting for timber and as windbreaks. The offshoot was the Forest Trees Planting Encouragement Act, 1871 which provided for grants of two acres of Crown land for every one acre of freehold planted in trees, with a maximum of 250 acres. This act was framed for Canterbury but phrased in such a way as to be applicable to all the Provinces. Most applications under the 1871 Act were from Canterbury or Otago.[14] Afforestation was a response limited almost entirely to the relatively treeless regions

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14. A return of grants made under the Act is given in AJLC, 1877, No. 24. See also LE 1/1883/136, an unpublished return to Parliament for 1883.

of the South Island. The rest of the country was amply forested.

2.5.3 Timber Licensing and Timber Reserves: A Conceptual approach

A sequence may be traced, in Canterbury at least, from a period of free use to one of regulated use of forest resources through licensing and reserves. Dissatisfaction with this administrative system led to popular and official statements that the alienation of forests was the best means to ensure their protection. All these developments may be viewed profitably from a property rights and externalities perspective.

Desmetz argues that "a primary function of property rights is that of guiding incentives to achieve a greater internalization of externalities" (Desmetz, 1967, 348). In the case of free use, which only lasted three months in Canterbury, the benefits were concentrated on the tree cutters and the costs were spread over the community. The costs took the form of wasteful use and depletion of the forest resources. For a time the community bore the cost of the losses, initially at least they may have been considered to be of insignificant proportions.

No single timber cutter had control over the actions of others involved in similar activities. Therefore, no individual would benefit from exercising restraint as there were no means of ensuring that others would follow suit. It would be more realistic to expect the opposite to occur and each timber cutting attempt to maximise his return by cutting as much as possible as quickly as possible. In another context this is the dilemma outlined by Harden (1968) in Tragedy of the Commons. In some instances free use has not led to over exploitation. Veblen (1978) describes special local circumstances which allow successful communal ownership of forest resources in a

South American example. Here excess use was avoided through close interpersonal relationships. The existence of special interest groups, and a desire on the part of the local population to remain independent. These conditions did not apply in nineteenth century New Zealand.

The costs of indiscriminate felling, in terms of wasteful use as well as depletion and possibly conflicts between timber cutters led administrators to seek greater control through regulations. Timber licences were introduced as a means of providing a right to use forest resources and as a means of allocation. The form of the licence was similar to other types providing access to Crown Lands in New Zealand and those used to regulated timber cutting in other lands of European occupation. The licensee enjoyed rights of entry to a designated area and the protection of any "improvements", that he made such as tramways. In theory at least, the price of the licence enabled the extent and rate of cutting to be manipulated. The licensee would benefit from the use of the forest and the community would receive the revenue from licence fees. However, there were problems in practice. Licence fees were established at arbitrary fixed rates, which tended to remain or even be lowered because of protests from timber cutters and saw millers, despite the efforts of some administrators to increase the fees. They were never sufficiently high to regulate the level of cutting to any extent nor sufficient to provide relative financial benefit to the community. The sawmill licence revenues from Otago and Southland were a partial exception.

There was another more crippling difficulty, apart from inherent weakness practical problems also frustrated the system. Timber licences granted a right to use forest on Crown Lands but this was not always respected. The initially unpoliced regulations did nothing to discourage illegal and unlicensed cutting. To some extent illegal

cutting may have provided a disincentive for raising licence fees, for the result would only have encouraged further unlicensed cutting. Some cutting also took place beyond licence area boundaries. Ineffective supervision cost the community much more than the financial returns from licence fees so that, in practice, timber cutters and sawmillers were benefiting at the expense of the community.

Administrative responses to abuse of timber regulations included the appointment of forest rangers and even cessation of the issue of timber licences. However, timber licences were designed to facilitate the use of forest resources. This provides a strong clue for their initial low prices and explains why efforts to restrict their issue were faced with difficulty. For instance, the Canterbury Waste Lands Boards stopped issuing timber licences for Banks Peninsula. But in 1864 on receipt of the opinion of the Provincial Solicitor, they were required to recommence issuing timber licences for that locality.

Sawmill licences in Otago and Southland were calculated in a more sophisticated manner which let them exert some control over the rates of deforestation on Crown Lands. However, the nature of the licensing system did not force efficient conversion of standing trees into sawn timber. By their very nature, the licences gave exclusive rights to defined areas and did not attempt an assessment of the quantity of timber on the site. There was no direct pressure to minimise waste during felling and sawing until Southland Province began to charge saw millers on the basis of a royalty of 3d per 100 superficial feet on sawn output. However, this was of only limited success as it was calculated on output and not on estimate of the volume of standing timber.

Timber reserves represent a somewhat different problem with respect to the apportioning of costs and benefits. Individual access as

under free use or as granted to licence holders was no longer permitted. A timber reserve was declared as an endowment for the future use of the community and a cadastral landscape was imposed upon the natural features of the land. Thus, the size of the reserves was influenced by assessments of likely future requirements rather than the designation of entire forest units. In some instances timber reserves were created for other purposes, such as the stock shelter reserves of Canterbury. The costs and benefits pertaining to timber reserves were both borne by the community. However, as with timber licensing, ineffective supervision resulted in illegal cutting on many reserves. In practice individuals benefited at everyone elses expense. The inability of administrators to provide satisfactory enforcement of the timber licensing regulations was a source of considerable criticism because of the degree of abuse. Within this context, a favoured contemporary solution, protection through alienation, makes sense. It was frequently suggested that the only answer to indiscriminate and wasteful use of forest resources was by allowing the Crown forest lands to become freehold. This suggestion concentrated the costs and benefits upon the owner and more importantly, from the administrator's viewpoint, seemed to eliminate the need for extensive supervision.

The timber licensing and timber reserves system that provided the basis of forest management systems during the provincial period faced increasing criticism by the 1870s. Proposed solutions were divided between increasing the efficiency of the existing structure and developing new approaches to forest management. The culmination of these concerns was reached with Premier Julius Vogel's proposals for a New Zealand Forests Bill in 1874.

CHAPTER III

"THERE IS NO SUBJECT MORE IMPORTANT FOR NEW ZEALAND":[1] THE NEW ZEALAND FORESTS ACT, 1874

3.1 INTRODUCTION

By the 1870s there was a conspicuous dissatisfaction amongst government administrators with the failure of timber licensing and reserves to adequately regulate the levels and efficiency of forest exploitation. The subject was taken up by several members of parliament who kept the forests question before the House from 1868 until 1874 when Premier Julius Vogel introduced a New Zealand Forests Bill. Although enacted in only a muted form this legislation has been lavishly described as "a milestone in the context of early New Zealand development" and a mirror of "prevailing attitudes to land and life in the young colony" (Wynn, 1977, 126).

The substantive material of this chapter pertains to the events leading up to the first nationally effective forest legislation in New Zealand. The chapter is structured in such a way as to separate prevalent conditions in the economic and physical environment from key individuals and events. This sieving serves as an aid in the recognition of the relative contribution of general background factors and special circumstances in the genesis and ratification of the New Zealand Forests Act, 1874.

The settlers of the 1870s were primarily concerned with the development and "improvement" of the natural resources of New Zealand. Most often this meant the conversion of lands to agricultural production. European settlement was thus accompanied by wideranging environmental modification. The first section of this chapter becomes

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1. NZPD, 1874, 16, Vogel, 79.

in part an exercise in geosophy, focusing on popular, official and scientific beliefs, both true and false, about the nature and significance of environmental modification. Changes to the indigenous flora, flooding and soil erosion, and the influences of forests on climate are examined in greater depth. This pool of ideas concerned with the question of timber supplies, flood prevention and climatic amelioration, summarizes under attitudes towards forest resources in the 1870s.

The later part of the chapter examines the personalities that contributed to, and circumstances which led to the New Zealand Forests Act, 1874 in the light of wider attitudes towards forest resources. A small core of scientifically minded politicians successfully drew attention to the forests question in New Zealand. Thomas Potts and W. T. Locke Travers were prominent in this respect, but the key individual was Premier Julius Vogel, an enthusiastic newcomer to forest management in 1874 and architect of the first nationally enacted forest legislation.

3.2 ENVIRONMENTAL MODIFICATION I: THE DISPLACEMENT CONCEPT

The assault on the New Zealand environment which accompanied European settlement had an impact on the indigenous flora and fauna, as well as accentuating flooding and soil erosion. These latter forms of environmental modification are expanded in section 3.3. The establishment and spread of settlement led to the transformation of a natural landscape with a high percentage of endemic species, to a cultural landscape. These changes were accompanied by, and to an extent a result of, the introduction of exotic flora and fauna. From the first it was observed that the exotic species were pushing out the indigenous varieties. Naturalists of international reputation such as Darwin and Hooker, and later New Zealand scientists, devoted

considerable attention to the "displacement" of the indigenous flora. The "displacement" concept was of threefold importance because:

1. the attitudes to landscape that it implied and the agents of change that were consequently overlooked

2. it acted as a barrier to the encouragement of forest protection, and instead, if anything, lent support to forest exploitation

3. by default it suggested that timber supply questions could be solved by turning to exotic species.

The growth and spread of exotic flora, many of which rapidly became naturalised, aroused considerable comment amongst early New Zealand naturalists (Kirk, 1869, 1878, Armstrong, 1871, Cheeseman, 1882). Of special interest was the relationship between the indigenous and exotic elements, which was usually viewed in terms of a Darwinian "struggle for existence", with the stronger and more vigorous species triumphing. A belief in the displacement of the highly endemic indigenous flora by superior exotic varieties had widespread scientific and popular coinage. The concept of displacement also had several important implications for forest management.

During the exploration of the Pacific, many eminent naturalists, including Sir Joseph Banks, Charles Darwin and Sir Joseph Hooker visited New Zealand. Darwin visited the Bay of Islands in 1835 on the homeward leg of the voyage of the *Beagle*. An acute observer, he noted evidence of recent deforestation and a lack of indigenous quadrupeds. But his most telling remark was directed at the impact of introduced species:

> "It is moreover said that the introduction of the common Norway kind (of rat) has entirely annihilated the New Zealand species in the short space of two years, from the northern extremity of the Island. In many places I have noticed several sorts of weeds which like the rats, I was forced to own as countrymen"
>
> (Darwin, 1933, 372)

This observation was made five years before New Zealand was proclaimed

a British colony. When in 1859, after a long gestation period abruptly ended by Wallace's independent development of the theory of natural selection, he finally published his ideas in the Origins of Species, several New Zealand examples were used:

> "The endemic productions of New Zealand, for instance are perfect one compared with another; but they are now rapidly yielding before the advancing legions of plants and animals introduced from Europe"
> (Darwin, 1951, 212)

> "if all the animals and plants of Great Britain were set free in New Zealand a multitude of British forms would in the course of time become thoroughly naturalised there and would exterminate many of the natives"
> (Darwin, 1951, 404)

Here apparently, in Darwin's observations and conversations in New Zealand, is a concept of considerable importance in nineteenth century natural science.

Other, less eminent, visitors raised different issues. Ernest Dieffenbach, a naturalist in the employ of the New Zealand Company from 1839 to 1841, made a number of remarks about the state of the forest flora. These included reference to the narrow range of species, damage caused by fires started by man, and the wasteful use of forest resources by sawmillers. He also criticised the settlers for wastefully exploiting the forest for short term profit. Of the Kauri forests he wrote,

> "Unless the strictest measures are immediately taken to prevent this reckless destruction, it is very certain that the forests of this noble tree will be greatly and irreparably reduced, as the Kauri is already a scarce tree, and is confined to very narrow limits"
> (Dieffenbach, 1843, 228)

Ferdinand Hocnstetter, an Austrian naturalist employed by the Auckland Provincial Council, was another who considered that the Kauri forest faced extinction (Hocnstetter, 1867, 141). A visitor to the Otago settlement in the early 1860s, Dr Lauder Lindsay, was another struck by "the necessity that seems to exist for the conservation of forests"

(Lindsay, 1862, 28).

Sir Joseph Dalton Hooker visited New Zealand in 1841. Hooker considered the question of species extinction in his introductory essay to the Flora of New Zealand (1853). He considered that the flora of small islands were relics from early times and slowly passing away leaving gaps which might never be refilled. One mechanism by which these "gaps" could be filled was through the arrival of new species, with the further result of competition between the indigenous and exotic flora:

> "it cannot be doubted that many of the small local genera of Australia, New Zealand and Soutn Africa will ultimately disappear owing to the upsurging tendencies of the immigrant plants of the Northern Hemisphere, energetically supported as they are by the artificial aids that the northern races of men bring with them"
>
> (Hooker quoted in Smith, 1957, 123)

Hooker amplified this position in two subsequent papers. In the first of these he considered the replacement of species in the British colonies, but the examples are primarily drawn from New Zealand and included quotations from his correspondence with W. T. Locke Travers and Julius Haast, the Provincial Geologist for Canterbury. "In Australia and New Zealand for example", wrote Hooker,

> "the noisy train of English emigration is not more surely doing its work, than the stealthy tide of English weeds, which are creeping over the surface of the waste, cultivated and virgin soil, an annually increasing numbers of genera, species and individuals"
>
> (Hooker, 1864a, 124)

He supported Darwin's view that "in the struggle for survival between the denizens of the old continent and the new" the European species were more vigorous through being in constant competition with each other (Hooker, 1864a, 125). This theme he returned to in overtly Darwinian terms of a "struggle of existence" three years later (Hooker, 1867).

In his earlier work Hooker referred to the displacement of some

genera; the later papers display a more extreme position anticipating widespread displacement of indigenous by exotic species. The influx of new flora had a conspicuous impact in the first three decades after colonization. In a more recent interpretation, Smith argued that,

> "It was undoubtedly the early manifestations of this process of displacement which gave rise to subsequent often fantastic fears of complete extinction of native plants through the single factor of competition by incomers, and Hooker's statement[2] was often invoked as a supporting prophecy"
> (Smith, 1957, 124)

In retrospect, Hooker's earliest analysis has proved the most accurate; a few cases of genus extinction have occurred, but the importance of man has been paramount to this occurrence.

New Zealand naturalists also directed considerable attention to the displacement concept. W. T. Locke Travers' contribution to Hooker's paper has already been referred to. Travers repeated his assertions before a local audience:

> "the results already caused by the introduction of new and novel organisms satisfied me that the indigenous flora and fauna even on their own ground are unable to cope with the intruders"
> (Travers, 1869, 312)

and that;

> "we may feel assured that the native life has little chance against the invaders and where the hardy European vegetation once begins to grow it usually retains its hold"
> (Travers, 1870, 335)

The idea of a vigorous invading flora enjoyed support amongst New Zealand and European naturalists. Some were quite extreme in their belief that displacement would be speedily accomplished and total. This was partly due to the speed with which exotic plants had been naturalised. One writer suggested that:

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2. Hooker quoted previously in Smith (1957, 123).

> "it must be quite evident to every observer that the introduction of these European plants will certainly result in the extermination of the indigenous flora, and that at no very distant period of time"
> (Armstrong, 1871, 285)

The reason for this displacement of species was attributed to the "weakness of constitution" of the indigenous flora, which "no longer had the strength to maintain its own" against the exotics. Armstrong did not however, attribute all flora changes to an immutable natural law, but emphasised that man's activities through clearing the forest, draining the swamps and cultivating the plains and valleys, also threatened the vegetation. The dual effect he perceived as disastrous for the future:

> "Under these combined influences it is evidently utterly impossible that the native plants can survive. Already the scarcer species are nearly extinct, and nothing can save our fine forests from destruction but the most rigid preservation of the Government"
> (Armstrong, 1871, 285)

Against this dual onslaught, the relative weighting of the two components not being discussed, but the Government was urged to take action. This is in marked contrast to the position of protection through alienation, generally favoured by those involved in timber licensing. The difference in viewpoint is presumably related to the variation in outlook between timber millers and naturalists. The timber cutter and sawmiller was concerned with production and personal rights to use the forest resource. Armstrong, in contrast, was concerned with the preservation of the natural values of the forest.

Another author, in a paper read before the Otago Philosophical Institute, likened the interaction between the indigenous flora and fauna to the Darwinian principle of "the survival of the fittest" (Gillies, 1877, 306). However the most authoritative New Zealand statements about displacement came from Professor Thomas Kirk, later to be appointed the second Conservator of Forests from 1886 to 1889.

He noted that after sixty years of European occupation about one third of the flowering plants of Auckland Province were exotic (Kirk, 1869, 132). On the basis of much careful observation Kirk refined the displacement concept considerably. In natural inland situations he considered any displacement to be very slow in occurring, but with the influence of man the process was greatly speeded up, "and the work of centuries is compressed into a decade" (Kirk, 1878, 362). The result was that,

> "the forest is destroyed, the vegetation of the plain is changed, or at least so intermixed with exotics that its aspect is entirely new. Foreign weedy plants spread through the land destroying by their superior vigour much of the original vegetation"
>
> (Kirk, 1878, 362)

Although referring to "superior vigour" Kirk, unlike Hooker in his later works (1864, 1867), did not attribute displacement primarily to competition, but emphasised the importance of sheep and cattle damage to forest undergrowth. He also argued for displacement and not complete replacement of the flora. To illustrate this point he cited instances of the changed environmental conditions allowing some indigenous species to display rejuvenated growth and compete successfully with the exotic species. Thus Kirk was inclined to dismiss the threat of extinction, except for a very few plant species, and argued for the amalgamation of the two floras. This viewpoint he presented again in detail in a Presidential address to the Wellington Philosophical Institute (Kirk, 1895).

An important botanical concept, displacement, was not confined to naturalists in New Zealand or overseas, but also enjoyed a popular dimension. Darwin's diary extract suggests that his first exposure to the displacement idea in New Zealand came from conversation with the European inhabitants of the Bay of Islands as well as direct observation. The public view was further summarised by Governor

Charles Bowen's inaugural address to the fledgling New Zealand Institute in 1868. It included three suggestions for botanical research: on various species of indigenous timber, investigating the qualities of fibre bearing plants, and facilitating the introduction and cultivation of exotic trees, plants, grasses, and ferns. His rationale was that,

> "The indigenous vegetation is fast disappearing before the progress of settlement, and it is alike the interest and the duty of their successes of the present generation to replace it by a new and remunerative growth"
> (Bowen, 1868, 6)

Implicit in Bowen's statement is a belief that the indigenous flora was weaker than the invading species. In the public mind, ideas about the weakness of the indigenous flora persisted long after the scientific community had reassessed the situation (Cockayne, 1921, Allan, 1936, Cockayne, Simpson and Thompson, 1932, Smith, 1957).

The displacement concept had several important implications for understanding environmental change, and by association, forests. A focus upon the superior "vigour" of exotics tended to mask the impact of winds, fire and grazing by introduced cattle and deer. Thus a significant cause of forest retreat and a contributor to accelerated runoff went largely unrecognized. Man's activities were not construed to have an impact; the displacement of the indigenous flora was regarded as an inevitable and natural course of events.

Acceptance that the indigenous flora was being displaced had special implications for forest management. Forestry operations on some systematic rotational basis, such as that proposed by Innes in Otago in 1874 (see Chapter II), was in the light of "displacement" ideas futile because the resource base was naturally fading away. Hence, it was probably argued, better to exploit it fully before it further wasted away. A corollary of the "lack of vigour" of indigenous

species was that exotic forest trees were regarded as superior and a future source of timber supplies.

Only a few dissenting voices were raised, urging that the potential of indigenous timbers be explored rather than suffer continued neglect. The displacement concept hindered scientific and popular support for more sophisticated management of indigenous forests. Once it was adjusted by naturalists with greater familiarity with the New Zealand environment, science no longer operated to discourage indigenous forest management in New Zealand.

3.3 ENVIRONMENTAL MODIFICATION II: FLOODING AND SOIL EROSION

New Zealand is a geologically young country, with a high mountain backbone and steep slopes, and in some localities heavy rainfall. Improvident acts by early settlers accentuated an already dynamic natural landscape. Early perceptions of environmental modification caused by flooding and soil erosion were recorded from the 1860s. But within a decade a small though influential group began to draw attention to the problems caused by flooding, soil erosion and inundation of land by shingle and stones. This group was further distinguished by advocating retention of forest cover and afforestation as a means to flood control rather than the usual engineering solutions. Thus a new rationale for forest reserves was created.

"Improvement" was the motive force of settlement. Man's works in converting the forest primeval to agricultural use was unquestionably good. However it was an inescapable conclusion that some environmental degradation was occurring, most notably in the form of floods which inundated the newly settled lands. The typical response was an engineering solution, usually in the form of stop banking. Engineering solutions subordinated the natural environment to technological solutions.

A variety of contemporary official documents and more recent histories offer some insights into the flood problem in nineteenth century New Zealand (eg. AJHR, 1869, D22; AJHR, 1877, I2B; AJLC, 1872, No 8; Doyne, 1864; Hector, 1868; Hawkins, 1957, 72; Gardner, 1971, 176-7). Flooding was severe over much of the eastern and southern South Island in February 1868. In Nelson seven inches of rain fell in 24 hours and in excess of eight inches was recorded at Mount Peel in Canterbury over the same period. W. T. Locke Travers, Member of Parliament and naturalist, made the journey from Christchurch to Nelson a fortnight after the floods had subsided and described stranded piles of timber and slopes stripped of vegetation and shingle. In the vicinity of the Waiau gorge, he noted,

> "These hills were scarred by innumerable small isolated slips, evidently from points on their sides of accumulations of water which had suddenly found a way between the surface-soil and the solid gravel below"
> (Travers, 1881, 85)

From his hill top vantage point Travers estimated that one twentieth of all the hill surfaces were scarred by slips. The provincial Superintendents of Auckland, Hawkes Bay, Nelson and Westland all indicated that flooding had occurred because of forest destruction.

This linking of deforestation to flooding provided a causal mechanism and a solution. Extensive damage was adjudged to have occurred in the Hutt Valley. However while linking a cause (deforestation) with an effect (flooding) the Superintendents, in all but two instances, were unable or unwilling to reverse the reasoning to prevent downstream inundations by protecting the forest cover of catchments. Nelson was the exception where it was proposed to reserve the forests on mountain ranges and river catchments. The Superintendent of Taranaki prudently suggested a similar course; reservation of the forest within a ten mile radius of the cone of Mount Egmont, although

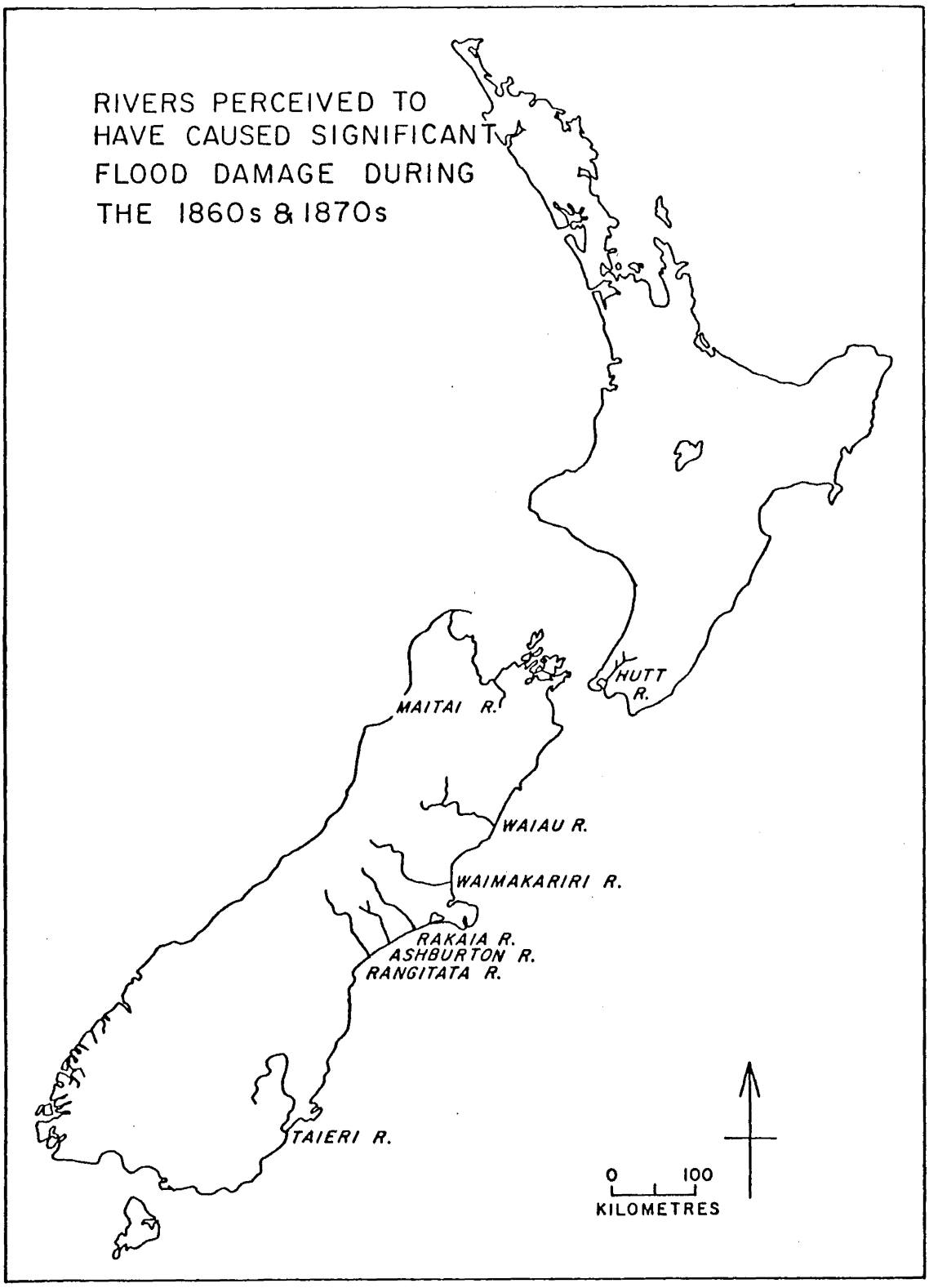
he claimed no flood damage had occurred. By the 1870s the Hutt River, the Maitai River, the Taieri River, and the braided rivers of Marlborough and Canterbury had all caused considerable damage to landholders through flooding (Figure 3.1). This is probably as much a reflection of the pattern of settlement as an absolute indicator of flood-prone rivers.

Once the problem of flooding had been recognized, the typical response was a corrective solution through engineering works. This remained the major response well into the twentieth century (Erikson, 1971). Favoured engineering measures included stop banking, channel straightening and clearing, planting trees along river banks, and the construction of storage basins into which peak flows could be discharged (Barr, 1872, Higginson, 1877, Arthur, 1881). This latter suggestion enjoyed some support on the basis of similar schemes constructed in Italy. However, the major reason for their suggested use was related to the difficulty of maintaining stopbanks on the aggrading braided beds of the South Island rivers. The temporary and illusionary security of stopbanking was also commented upon by one engineer:

> "Immunity from destructive floods during the last few years, together with the extension of the Taieri River embankments appear to have introduced a sense of security amongst the settlers of the Taieri Plains which may at any time be somewhat roughly disturbed"
> (Arthur, 1881, 94)

Flooding also attracted attention at the Provincial and General Government level. A Select Committee of the Nelson Provincial Council reported in 1862 on the flooding of the Maitai River. It proposed either diversion into a new channel or straightening the existing stream and protecting it with a wooden breastwork. Considerable attention from 1863 was focussed on the Waimakariri River by the Canterbury Provincial Council. In 1864 W. T. Doyne furnished his Report upon the Waimakariri and the Lower Plains of Canterbury, New Zealand. This was followed by

Figure 3.1


RIVERS PERCEIVED TO
HAVE CAUSED SIGNIFICANT
FLOOD DAMAGE DURING
THE 1860s & 1870s
HUTT R.
MAITAI R.
WAIAU R.
WAIMAKARIRI R.
RAKAIA R.
ASHBURTON R.
RANGITATA R.
TAIERI R.
0 100
KILOMETRES

further reports in 1864 and 1865. In 1868 James Hector's Geological Report on the River Waimakariri stated that,

> "there is every reason to believe that Christchurch is in imminent danger from the recurrence of floods like those which have so frequently occurred of late in the Waimakiriri River, and that the works at present executed would prove quite inadequate to overt the calamity."
> (Hector, 1868, 3)

The recommendations of a Select Committee appointed to consider the matter were adopted and a board of river conservators appointed. The cost of further river protection work was to be raised by rates which necessitated the passage of the Canterbury Rivers Act through the General Assembly. The preamble of the act described its purpose as,

> "to make provision for the management of certain Rivers in the Province of Canterbury and to provide for the making, repairing and maintaining of protective works to lessen the damage occasioned by the overflow of such rivers."
> (NZS, 1868)

Some scientists and engineers, influenced by close personal observation and overseas writers such as Marsh, developed a new understanding of cause and effect in flooding. Marsh (1864) popularized the idea that forests protected the water supply within and beyond their boundaries and that their removal contributed to flooding. He identified a cause and an effect: deforestation and increased flooding. Further, he reversed the reasoning to suggest that tree planting would ease the flood problem. This was a biophysical rather than a technological solution to the flood problem and also created a new rationale for forest reserves.

Conventional engineering solutions were costly and required regular maintenance. The braided rivers were an unfamiliar landscape feature where old solutions were difficult to apply. This led to alternative methods being advocated. Although Higginson (1877) considered tree-planting along riverbanks too difficult to warrant the effort,

Arthur Dobson, better known as the discoverer of "Arthur's Pass", strongly advocated such a course of action. He felt that this was a feasible solution in Canterbury and offered the additional benefits of providing a source of posts and rails and through exercising "a very beneficial effect upon the climate of the plains, checking the north-west winds and inducing a greater rainfall" (Dobson, 1881, 103).

Although Dobson proposed a new central mechanism, his rationale was still that of the engineer. The very title: On the Reclamation of Waste River Bed, indicates that he regarded the braided rivers as improvable through man's intervention. Certainly they were different from European rivers. Just as unoccupied land was considered to be wasteland, so the wide expanses of river bed occupied only by a few small streams, except when in flood, were regarded as undeveloped land, which could be secured for grazing and afforestation purposes if and when the river could be confined to a single channel.

The opinions of some of the dissenters were important because of their political office and connections. W. T. Locke Travers, for example, while recognising that heavy rainfall, steep country, and erodable materials contributed to the flood problem, asserted that man's input was equally important:

> "Many causes, too, resulting from men's foolish and wanton interference with natural operations, had contributed to bring about a rapid accumulation of the rainfall in the main rivers"
>
> (Travers, 1881, 76)

Travers identified forest clearance, repeated burning off[3] of grasslands and soil compaction by stock grazing as three factors contributing to flooding and erosion. He was not alone in linking vegetation cover and runoff. An essentially similar position had been taken by

---

3. For Otago, see Buchanan (1869) and for Canterbury, Armstrong (1879, 326).

Dobson (1871) in his paper On the Destruction of Land by Shingle-Bearing Rivers, and Suggestions for Protection and Prevention. He described in some detail how he believed that the vegetation acted as a buffer to runoff and how sawmilling and land cultivation "increased the rapidity with which the rainfall is carried into the river, and the floods necessarily rise higher than before" (Dobson, 1871, 155). As many of Nelson Province's catchments were made up of shingle, he "confidently expected" that unless steps were taken "on some general scheme, to preserve the woods which clothe the mountain drainage basins" and protect the riverbanks, considerable damage would occur. Dobson drew specific attention to Marsh's Man and Nature regarding the implications of indiscriminate forest clearance.

Despite the extent of the problem, Travers remained optimistic that the means to a solution was at hand. He felt that in Europe private landownership exacerbated efforts at flood protection because individuals tended to maximise their benefits, thus he urged the retention by the Crown of mountain forests:

> "it is it's [the Crown's] imperative duty to retain that possession and control, and to provide severe punishment for acts calculated to produce evils of the kind referred to"
>
> (Travers, 1881, 5)

In the period up until the 1870s forest resources had, with the exception of the stock shelter reserves of Canterbury, been equated with timber supplies. Travers, Dobson and others recognised that the forest resource was more than just a supply of timber; they identified links among flooding, erosion and the deforestation of catchments which caused them to advocate forest retention and planting to protect soil and water values and property. Not only had a new rationale for forest reserves been recognised, but the means of attaining the goals was in complete contrast to that advocated when

forest was equated solely with timber supplies. Whereas protection through alienation was widely favoured for increased efficiency in timber production, extensive tracts of forest left untouched and under Crown ownership were advocated for catchment protection. In terms of man's attitude to environment, the emphasis here was not on confronting (and improving nature) through engineering works, but on changing the landuse pattern so that landscape modification would not adversely affect settlement.

The enthusiasm with which some observers attributed environmental modification to man's improvident actions has had an enduring impact. While it was a significant reassessment to perceive of some of man's activities as causing environmental damage, there was in some quarters a tendency to over-apply the ideas. The equivalent North American situation has been described by Raup (1964) who drew attention to the unquestioned assumption that primeval forest was more productive than past settlement forests which had been "destroyed, devastated and debased by Western Europeans after they came to America" (Raup, 1964, 20). The legacy of the recognition of man as an historical agent of change in forest and mountain lands in New Zealand has been a tendency to disregard natural instabilities in the landscape. O'Connor (1976, 11) refers to this as "the myth that we have nourished: that without the interference of man our mountains would have remained well clothed".

3.4 FOREST INFLUENCES

The belief that forests produced a significant effect upon the weather and climate of a region extended back as far as the fifteenth century and eventually played a part in the earliest forest conservation measures in the United States (Lull, 1949) and Australia (Lewis, 1975). In later years superstition and myth gave way to speculative

theorizing, including contributions by pioneer geographer Alexander von Humboldt about the effect and impact of forest influences (Peppercorne, 1879, 30). By the late 1860s the first experimental work was being undertaken by European foresters using psychrometers, maximum-minimum and soil thermometers, rain guages, and evaporimeters in an attempt to directly compare forested and non-forested areas. However, not until the twentieth century were the relationships between forest, climate, and weather more accurately understood (Brookes, 1927, 1928, Zon, 1941, Dana, 1956).

A persistent view, in the pre-experimental period, was that the forest influenced visibly a wide range of climatic and meterological parameters. Marsh (1864) reviewed the range of influences attributable to forests in Man and Nature (Table 3.1). He was prepared to concede that the knowledge of forest influences was imperfect:

> "the conclusions of the physicists respecting it are in the great degree inferential only, not founded on experiment or direct observation. They are, as might be expected somewhat discordant though certain general results are almost universally accepted"
>
> (Marsh, 1864, 122)

The relationship between forest cover and rainfall was perhaps the most widely held of the many claimed effects. In essence, the argument ran, forests attracted rainfall and deforestation reduced precipitation. The next progression was to insist that afforestation would restore or modify and improve the climate of a region by increasing its rainfall (and usually a host of other climatic parameters). Marsh was cautious in his summary, which reveals something of his own astuteness:

> "The effect of forest on precipitation then is not entirely free from doubt, and we cannot positively affirm that the total annual quantity of rain is diminished or increased by the destruction of the woods, though both theoretical considerations and the balance of testimony strongly favour the opinion that more rainfall falls on wooded than open country"
>
> (Marsh, 1864, 122)

Table 3.1

EXTENT OF FOREST INFLUENCES NOTED BY MARSH IN

MAN AND NATURE

Phenomena	Effect of Afforestation	Effect of Deforestation
hailstorms	retards	accentuates
frosts	retards	accentuates
arrival of seasons	retards	accentuates
wetter winters	accentuates	retards
flooding	retards	accentuates
Malaria	protection from	accentuates

An alternative rainfall theory held that opening land to the plough increased precipitation by allowing increased moisture into the soil and thence to be evaporated (Meinig, 1954, 1962). Although widespread in North America and Australia this argument never assumed significant proportions in New Zealand. Perhaps this was because the plains areas were fairly rapidly turned over to pastoral uses and agricultural lands were, in the North Island at least, cut from the forest.

Thus the forest influences concept found expression in New Zealand through Marsh's volume, other overseas writings and from direct, largely qualitative comments of the local environment. Consequently the debate was centred on the applicability of overseas forest-rainfall relationships to the New Zealand situation assessed by informal observation and experience of the local environment. Frederick Peppercorne read a paper entitled the Influence of Forests on Climate and Rainfall to the Hawkes Bay Philosophical Institute in 1879. The essay was entirely drawn from secondary source material and included examples from French forestry literature, Marsh's text, Frederick Goyder's work in South Australia (see also Meinig, 1962 and Powell, 1976), and referred to a diminuation of rainfall with deforestation of the Mauritius. The latter example was doubtless drawn from papers on forest management tabled by Premier Julius Vogel in 1874 (AJHR, 1874, H5). Peppercorne supported fully the conventional wisdom:

> "No fact is better authenticated than that of the beneficial influence exerted by the presence of forests on the climate and rainfall of a country, and, on the other hand, of the injurious effects on both that is brought about by the destruction of forests, or by their absence"
> (Peppercorne, 1879, 24)

Referring to the estimates of deforestation prepared by James Hector of the Geological Survey (AJHR, 1869, D22) Peppercorne stressed the importance of the "forests question" to the country as:

> "one which will so greatly influence its prosperity, together with its commercial value as a colony, its climate, and its salubrity"
> (Peppercorne, 1879, 31)

The forest influences concept was one of the rationales for legislative efforts. The Report of the Joint Committee for Colonial Industries recommended the encouragement of forest tree planting on the plains of the South Island for protection against the weather:

> "The strong winds prevailing over many parts of New Zealand greatly tend to check the operations of agriculture while the open and shelterless state of the country causes the soil to become much more readily dried and parched than would otherwise be the case"
> (AJHR, 1870, F1, iv)

The committee recommendations led to in part the passage of the Forest Trees Planting Encouragement Act, 1871. However, it is interesting to note a change in emphasis evident in the report. It was not claimed that afforestation would improve the climate in total, rather that it would protect agricultural activity from the damaging effects of wind. Forest influences were being attributed only at a micro-climate level. By contemporary standards this was a conservative assessment of forest influences extent. John Barron presented the conventional wisdom in assessing the likely impact of trees upon the climate of Otago. He supported shelterbelt effects but also reiterated the popular view on forests attracting rainfall; as evidence he cited a letter that had appeared in the Otago Daily Times:

> "Where a farmer is reported to on several times seen the scud of rain passing over and falling on the bush near his farm, while not a drop fell on his own dry pastures and prematurely withered grain"
> (Otago Daily Times, 27 July 1872, 2)

He claimed that this would have not occurred if the farm had been surrounded by bushland:

> "because trees attract raincloud, and it gives off its moisture freely to them, and supposed the distance was not too great between the two strips of forest land rain would fall on the intervening ground"
> (Otago Daily Times, 27 July 1872, 2)

Barron did not however, discuss the mechanism by which trees attracted rain clouds.

Nineteenth century forest influence ideas provide insights into attitudes towards environment and the level of understanding of causal relationships in the natural world. The forest influence issue reveals a particular attitude to environment. The general reaction of European settlers to New Zealand was to "improve" the environment. In part this meant recreating it in terms of their homeland as it was, or as the rural arcadia some wished it to be. This outlook was most conspicuous in terms of land settlement and the conversion of bushlands to agricultural use. However it was not restricted to land, for with the forest influences concept as a rationale, it was believed that the climate of New Zealand could also be "improved".

Speculative theorising and subjective assessments rather than experimental work on forest influences were the norm until the late 1860s and much beyond in New Zealand. Simple monocausal explanations were a result. On this basis conflicting views were a certainty. Those who took the contrary view that forest clearance increased rainfall, may in fact have based their opinions on direct observation, but with a faulty recognition of cause and effect. It is possible that rapid runoff, as a product of deforestation, resulting in higher river levels, was attributed to increased rainfall.

Forest influence ideas are closely related to, but distinguishable from, flood prevention by afforestation and catchment vegetation protection. The latter was often, confusingly, referred to as preserving the climate. Together they provided two new rationales for the preservation and planting of forests in New Zealand.

3.5 INDIGENOUS FOREST RESOURCES AND EXOTIC AFFORESTATION

Widespread forest clearance and wasteful usage was apparent to some administrators, politicians and members of the public by the 1870s. This situation elicited a number of responses. Some individuals wished to integrate efficient timber utilization into the transition from forest to field. Others began to predict a coming timber famine. This gave urgency to the first experimental efforts at propogating indigenous forest trees. Difficulties encountered in pursuing this goal were accentuated by the ease with which exotic forest trees were grown. In consequence afforestation in the popular mind became the solution to any future timber supply problems. The irony of this situation whereby natural forest was cleared for settlement and later in part replanted with exotic trees to ensure future supplies did not escape some contemporary observers.

The majority of the accounts of early New Zealand contain at least some reference to the forest resources (eg. Heaphy, 1842, Hurthouse, 1861). In the main these reports were limited to a description of the major species and some observations about their utility. Subsequently more rigorous engineering tests were made on the New Zealand timbers to assess their qualities (eg. Balfour, 1865, Blair, 1876, Laslett, 1894).

However, the waste occurring in the timber industry, the "necessary destruction over areas in the process of settlement" (Kirk, 1878, 459), but more importantly, the neglect and misuse of indigenous timbers, prompted Professor Thomas Kirk to urge the more effective use of forest resources. He was especially perturbed about the neglected timber market, which he attributed to ignorance of the possibilities and "wantonness" in the use of high quality timber for inferior uses, particularly in the Kauri forests of Northland. Kirk

estimated that the Kauri forests would be exhausted within thirty years.

Effective utilisation of neglected indigenous forest trees was advanced as a means of providing capital to the small landowner, while he was clearing the land and establishing himself:

> "Commencing with little or no capital, our settlers would gladly welcome the opportunity of converting a large portion of their timber into hard cash instead of ashes, and would thus be enabled to tide over the first years on the land with less difficulty than at present"
> (Kirk, 1878, 459)

Kirk was advocating the effective use of forest resources in the conversion from a sylvan to an agricultural landscape. The forest was to be an asset and not a liability to settlement. Such transitional landuse changes are discernable elsewhere, for example New Brunswick in Canada (Wynn, 1980). To lend weight to his argument Kirk provided details of how to best cut and store the indigenous timbers. The crux of the scheme was economic, and here problems emerged. "It is not easy to form an exact idea of the cost of conversion and delivery at the port of shipment, so much depends on the situation" (Kirk, 1878, 460). Rewarewa, he suggested, could be converted for 10d per cubic foot with an additional 1/- for freight costs, in a market where the usual price ranged from 1/6 to 2/- per cubic foot. These figures do not seem to bear out Kirk's assertion that such a return would yield a "handsome profit" to the settler. Kirk wished for efficient use of forest resources, but the wider economic situation encouraged clearance by burning and cutting (eg. Kelly, 1877). The wasteful exploitation of timber continued with export options not remaining consistently profitable.

Another approach to realizing the potential of indigenous forest trees was exemplified by efforts at their successful propogation and transplanting. Difficulties had been encountered in attempting this

(eg. Deans, 1964, 55). However the reasons for this failure had been wrongly attributed to a lack of vigour in the various species, that is to say in terms of "displacement" ideas. Thomas Potts lamented the destruction of the forest before settlement and drew attention to the dangers of burning off pasture and wasteful use of forests. His opinions were not always motivated by aesthetic considerations, but had much to do with the unexplored potential of threatened indigenous forests:

> "the wasteful management of the once magnificently timbered forest threaten at no distant period the almost entire destruction of many interesting and valuable species, before time has been afforded to ascertain their real position as a portion of the economical resources of the country"
> (Potts and Gray, 1870, 181)

An observant field naturalist and practical arboriculturalist, Potts was alert to the special environmental conditions required to successfully propogate indigenous tree species. Thus he did not fall into accepting arguments of "inevitable displacement" of the indigenous flora. Others were also coming to realize that the forest flora of New Zealand required special growing conditions, distinct from the techniques employed in Europe and Britain. For example one writer noted that,

> "it is but natural to suppose that the plant will not succeed when removed from its natural habitat with all its roots entirely enclosed in a ball of earth, and planted in an open situation"
> (Hay, 1872, 452)

Hay suggested that temperature, shade, and moisture conditions approximating those occurring naturally were essential for the successful cultivation of "native trees".

Both Potts and Hay encouraged mixed plantations of exotics and indigenous forest trees. This was favoured because blight and aphis attack had alerted Potts to the potential susceptibility of monocultures to disease (Potts, 1886, 174). Both made reference to the

diminished vigour of indigenous trees in managed environments. Practical knowledge for cultivating indigenous trees was growing, but there was, even though Pott's acknowledged their beauty, no sanctification of native forest in its own right. Arguments for indigenous forest cultivation continued to be couched in terms of economic opportunities that were being lost through lack of action.

Experimentation with indigenous (and exotic) forest trees was treated with more concern as estimates of timber famine began to occur in the 1870s (Table 3.2). These were not based on any detailed field reconnaissance. Instead they reflect the impressions of observers during a period of rapid deforestation. Hay's estimate was the most generous, and similar to Campbell Walker's, the others set the exhaustion of forest resources two decades earlier at the turn of the twentieth century. Several means of averting a timber famine were suggested. Replanting with indigenous forests and exotic afforestation were two options considered. Reliance upon timber imports was never seriously entertained and neither did the few suggestions for sustained yield indigenous forestry attract any real popular or official attention.

Planting enjoyed support over indigenous forest management for a number of reasons, based on heritage and environmental attitudes. In combination with the doubts raised about the growth habits and utility of indigenous woods, the necessary demands of the timber industry and settlement, it was not surprising that tree planting was looked to by many as the only viable means of ensuring future timber supplies.

It was more than a matter of replanting forests. Afforestation proposals almost inevitably were couched in terms of using exotic species. Small stands of old world species, even if only for orna-

Table 3.2

ESTIMATED DURATION OF TIMBER SUPPLIES

Source	Estimated duration (years)	Exhaustion Date
Hay (1871)	50	1921
Firth (1874)	30	1904
Campbell Walker (1877)[1]	40	1917
Kirk (1878)	30	1908
Armstrong (1879)	25	1904
Peppercorne (1879)	20	1897

Notes

1. Based on Kirk's then unpublished estimate.

mental purposes, were part of the design of some colonists to recreate a Britain of the South Seas. The qualities of familiar species were known, as was the means of their cultivation, and they were believed to be superior to the indigenous trees which were regarded as lacking vigour and being slow growing. The New Zealand flora, limited in range of species, was thought to be improvable through man's intervention:

> "There are many noble specimens of the vegetable world peculiar to New Zealand and deserving of utmost care; but there are also deficiencies which may be filled up by judicious introductions, and for this operation the mild or equatable climate of the colony is particularly favourable"
>
> (Munro, 1869, 173)

Sir David Munro, Speaker of the House of Representatives from 1861 to 1870, subsequently explained how he foresaw no reason why exotic and indigenous species "should not be seen growing together in one and the same wood" (Munro, 1869, 173).

It was soon discovered that New Zealand possessed a favourable environment for a wide range of exotic flora and fauna. Many performed vigorously in their new habitat. Unfortunately acclimatisation was anything but "judicious"; as early as 1872 the extinction of New Zealand bird species was remarked upon in Nature:

> "Most of them (the introduced species) are insuperable: but there is another, and possibly more powerful cause which is entirely under control. This silly mania for "acclimatisation" which has been so warmly fostered by many well-meaning though ill conceived persons both at home and in the colonies, and nowhere more than in New Zealand"
>
> (Anon, 1872, 6: 219)

There was enthusiastic experimentation with European timber trees and new species primarily from Australia, mainly Eucalyptus species, and North America. One of the most successful introductions was Pinus radiata, originally from the Monterey Peninsula in California which assumed central importance during the afforestation boom of the

1920s (Allsop, 1969, Simpson, 1973).

The prejudice against planting with indigenous forest trees mitigated against efforts to explore their potential, although some individuals, notably Potts, attempted rather unsuccessfully to amend these views. An astute observer, he recognized that European techniques were not necessarily transferable in total to the New Zealand environment, which perhaps explains why he argued for mixed plantations of indigenous and exotic species. Potts remained cautious about the economic returns from an activity that was "speculative and hazardous" (Potts, 1878, 391). Private plantations were established by the late 1870s, principally on the open plains of the South Island where the prime rationale changed from timber supplies to shelterbelts. Not until the twentieth century did exotic plantations contribute significantly to the national timber supply.

3.6 THE FORESTS QUESTION 1867-1874

By the 1860s and 1870s the failure of timber licensing regulations to achieve efficient exploitation of forests was apparent to administrators. New means of managing forest resources were developed in response to these difficulties. These may be grouped into seven major episodes from 1867 when events culminated in the passage of Julius Vogel's New Zealand Forests Act, 1874. In chronological order, the seven episodes are:

1. Proposals for bush reserves in Otago
2. "The Present Condition of the forests of the Colony"
3. Forest Tree Planting legislation
4. The Lapsed Conservation of Forests Bill of 1873
5. The Timber Floating Act of 1874
6. Julius Vogel's bush settlement proposals of 1874
7. The New Zealand Forests Act of 1874.

The arguments used and viewpoints held during official and political discussions on forests in the 1860s and 1870s stem directly from wider environmental attitudes (see sections 3.2 to 3.5) and the timber licensing and reserves system (see Chapter II). However, it is also possible to trace the contribution of a small number of educated naturalist-politicians who exerted influence out of proportion to their numbers. These included Thomas Potts and W. T. Locke Travers. The involvement and stance of Julius Vogel throughout is also examined. This serves to place his 1874 Act in a clearer perspective.

3.6.1 Bush Reserves in Otago Province

In 1867 a motion "For leave to bring in a Bill to provide for the Management and Conservation of the Public Bush Reserves in the Province of Otago" (OPC, 1867, Session XXIII, 11) was affirmed by the Provincial Council. William Mosely, who proposed the motion, also asked for a return of bushlands of less than 10 000 acres in the province to enable further reservations to be made under section 62 of the Otago Waste Lands Act, 1866. Further, he urged the Provincial Superintendent to reserve bushlands from sale in districts where there was a scarcity of forest until reserves could be made under the Waste Lands Act. Mosely reiterated his appeal in 1868. On this occasion an amendment was proposed and passed by division to the effect that,

> "provisions shall be made for the management and preservation of such Bush Lands so as to prevent the entire destruction of the growth of timber"
>
> (OPC, 1868, Session XXIV, 21)

Julius Vogel was one member of the Provincial Council who voted against the motion. It is possible that his opposition was based on the vagaries of provincial politics. On subsequent occasions he was consistent in his favouring of the development of natural resources.

In April of 1868 a Select Committee of seven was appointed to investigate "the whole question of bush reserves" (OPC, 1868, Session XXIV, 26). The Provincial Council spent some time in committee discussing the report, until finally seven resolutions were agreed upon (Table 3.3). On the occasions that Vogel participated in divisions, he voted against the proposals. The resolutions adopted in committee illustrate a more comprehensive attention to questions of timber supply, minimisation of waste, and effective supervision of forests. Mosely's original proposal called for a bill dealing specifically with the "Management and Conservation of Crown forests". Of the existing legislation, only a few clauses in the Provincial Waste Land Acts dealt with forests. A special purpose piece of forest legislation indicated a new heightened awareness of the need for forest management. The resolutions proposed a formula, based on reserving a portion of the existing Crown forest in locations where timber was from scarce to abundant. In areas of increasingly abundant forest smaller acreages were to be reserved (Figure 3.2). Thus, forest reservations were to be limited and related to the spread of settlement. Agricultural land use predominated and the reserve acres formula was intended to provide adequate forest resources for the future requirements of the associated communities.

An attempt was made to facilitate greater efficiency into forest utilisation by introducing an auction system whereby blocks of land were leased to the highest bidder. Price fixing for sawn timber and firewood, which distinguished between forest stands of varying quality, were proposed. These devices prevented the sawmiller from passing all of his increased costs onto the purchaser by increasing the price. By internalising the sawyers' costs so that wasteful use reduced profits, it was hoped to regulate reckless use of the forest resource. Local

Table 3.3

RESOLUTIONS ON BUSH RESERVES BEFORE

THE OTAGO PROVINCIAL COUNCIL, 1868

"1st. That in all Bush Lands, exceeding in extent 10,000 and not exceeding 20,000 acres in extent, at least one-tenth of such Bush Land should be reserved from sale and set apart for public use, and in all Bush Lands exceeding in extent 20,000 acres, at least one-twentieth should be reserved from sale, and set apart as aforesaid.

"2nd. That all Bushes not exceeding 2,500 acres in extent should be reserved for public uses, and in all Bushes exceeding 2,500 and not exceeding 10,000 acres in extent, one-half should be reserved for public use and such Reserves, when granted to the Superintendent in the usual way, should be managed by the various Local Road Boards, under the control and supervision of the General Road Board.

"3rd. That the General Road Board have power to lease all Bush Reserves in such Blocks as they consider advisable; such Leases to be sold by public auction to the highest bidder, and to contain covenants fixing the maximum price to be charged for the various descriptions of timber, such as sawn and split timber and firewood, and for preventing waste and wilful destruction of timber and young trees.

"4th. That in districts where no Local Road Boards exist, the General Road Board shall have power to appoint a manager or managers to manage and look after the preservation of such Bush Reserves.

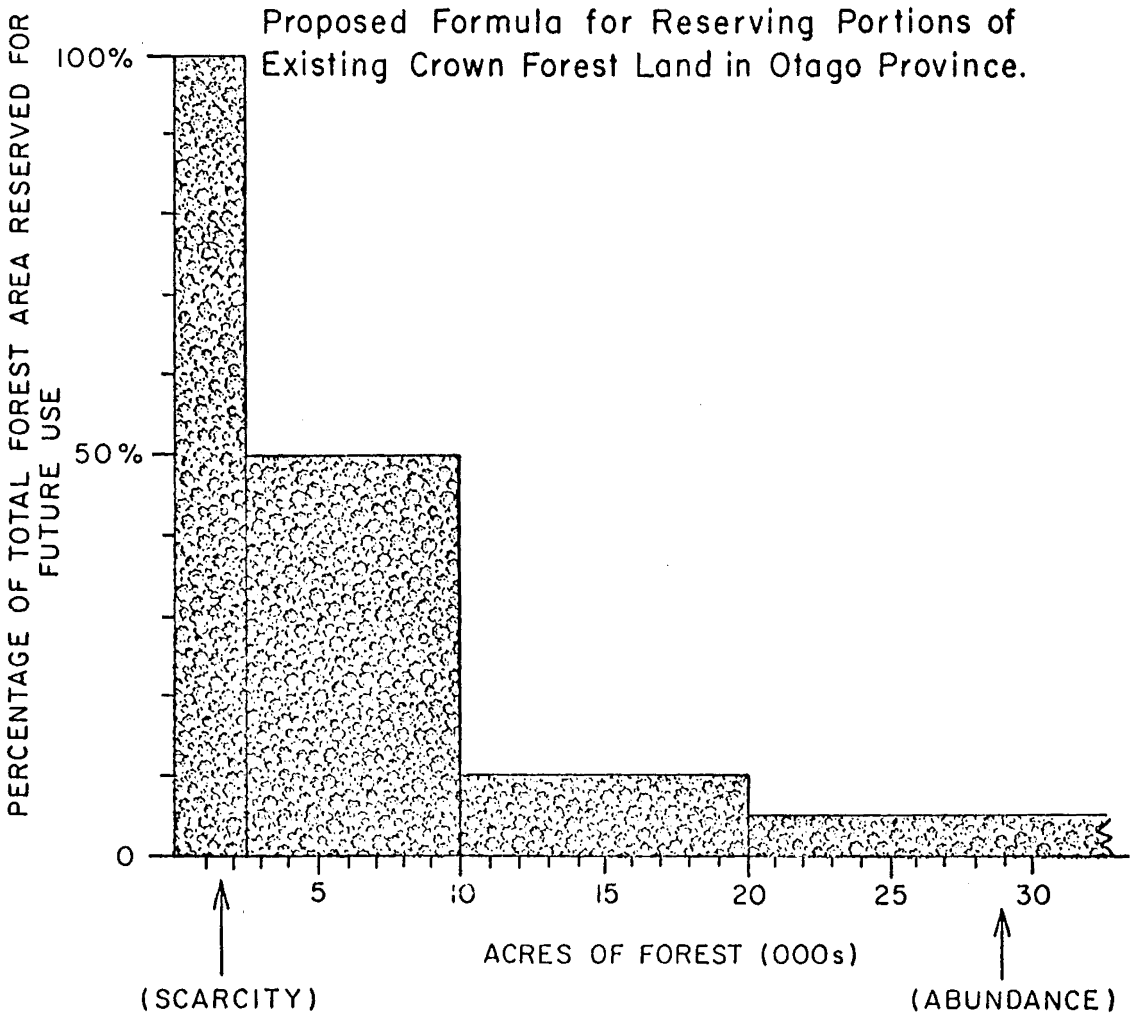
"5th. That all Bushes within Gold Fields of less than 20 acres in extent, should be exempt from the operation of the above Resolutions.

"6th. That blocks of land not exceeding 50 acres in extent should be reserved from sale in such suitable places throughout the Province as may be desired by parties willing to plant forest trees, subject to Regulations fixed upon by the Government, and that Crown Grants for such lands should be obtained in favour of such persons after the Regulations so made have been fulfilled by them.

"7th. That these Resolutions shall only apply to lands which have been declared into Hundreds."

Source: Otago Provincial Council, 1868

Figure 3.2



(OPC Votes and Proceedings)

Roads Boards were to undertake the administration of the forest reserves, thus management was to be undertaken by agencies aligned with the wider spectrum of land settlement and development. Proposals for plantation reserves of up to 50 acres indicated that in some localities a shortage of timber supplies was anticipated and that indigenous forests were not, at least in Otago, regarded as inexhaustible. The important point is that timber supplies in the future would be met by artificially cultivated plantations rather than natural forests.

The division calling for support of the seven resolutions on Bush Reserves resulted in a tie, which was broken when the speaker cast his vote against their adoption. The first Provincial initiative thus ended in failure.

3.6.2 The Present Condition of Forests in the Colony

Although the Otago initiatives came to nothing, attention was drawn to the forests question in the House of Representatives four months later in October of 1868. The occasion was a motion proposed by Thomas Potts asking the general government to "take steps to ascertain the present condition of the forests of the Colony, with a view to their better conservation" (NZPD, 1868, 4, 188).

Potts had repeatedly turned to the question of improved forest management in a number of scientific papers mostly presented to the local branch of the New Zealand Institute, the forerunner of the Royal Society of New Zealand. His position as a Member of Parliament gave him the opportunity to voice his concerns at the highest level. Although principally concerned with the South Island, he foresaw the time when the North Island would be similarly affected. He described his concern over forest depletion in terms of the negative impact that

it had on settlement:

> "the rapidity with which the woods were destroyed would make them disappear in a short time, and work a great change in the prospects of the settlers"
> (NZPD, 1868, 4, 188)

Potts was concerned with timber supplies. He drew attention to the inefficiency of timber licensing and losses through fire. This was a typical response of a concerned observer of the time; his attitude to erosion and floods was more innovative.

He outlined various mechanisms of forest destruction, including fire, wanton destruction and their consequences such as climatic modification and flooding. These statements were supported by reference to events in Victoria, the United States of America, France, and the writings of Marsh. Potts also cited examples of environmental modification in New Zealand from Dieffenbach (1843) (not acknowledged by name) and Hochstetter (1867).

Members who spoke in support of the motion included Edward Stafford, Charles Heaphy, Donald Reid, W. T. Locke Travers and Charles O'Neill. Reid had been a member of the Select Committee of the Otago Provincial Council on Bush Reserves and a supporter of the lapsed resolutions. He seized the opportunity to again address the forests question. Travers in his scientific addresses referred to the linkages between deforestation and flooding. Using American and European as well as local examples he reiterated his position before the House:

> "The destruction of the forests in the upper portion of the larger valleys had a most pernicious effect on the drainage of the country, and by precipitating the rainfall into the rivers with great rapidity, produced the destructive floods that had become common"
> (NZPD, 1868, 4, 191)

He ascribed recent flooding by the Waimakariri River in Canterbury to this cause and also drew attention to the neglect of the potential of the indigenous forest products.

Opponents described the presence of forest as an obstacle to settlement. One member suggested that they could best be protected by alienation, but the most significant opposition came, interestingly, from Julius Vogel. Initially Vogel chastised Reid for introducing provincial political issues into the House but then continued to expand on his views on the role of the forests in the development of New Zealand. He believed that,

> "the invariable rule in a new country was the lavish use of native forest, just as in a new and productive gold field the miner was lavish"
> (NZPD, 1868, 4, 190)

Vogel was, however, conscious of the need to maintain timber supplies. To this end he likened the use of forest lands to "that of commonage" so that the real task was "teaching the people not to be too lavish in their use" (NZPD, 1868, 4, 190). Beyond this he also argued that alienation of forests would ensure the efficient use of timber supplies which could be further supplemented by plantings. Vogel commented only on the timber supply issue. He seemed unaware of the new rationale for forest protection that Potts and others were proposing. Potts' motion was agreed to and information was collected from the Provincial Superintendents and tabled in the following year (AJHR, 1869, D22).

3.6.3 Forest Tree Planting Legislation

From the first plantations were the favoured means of providing future timber needs especially in the treeless regions of the South Island. Small woodlots formed part of the Canterbury landscape as envisaged by the members of the Canterbury Association. In 1858 a Canterbury Provincial Council Ordinance was issued to encourage the planting of forest trees by tenants. Interest became more widespread as time progressed and concern over timber supplies intensified. The Report of the Conference on Agriculture (OPC, 1868, Council Paper

No 3) recommended tax exemptions for land owners planting trees and the establishment of plantation reserves. Similarly, a Canterbury Provincial Council Committee also encouraged the planting of timber trees for shelter to agriculture from the wind, as a supply of timber for building and fuel, and for its effect on "improving the climate" of the Province (CPC, 1870, Committee on the Establishment of New Industries). In the same year the Report of the Joint Committee on Colonial Industries (AJHR, 1870, F1, 10) voiced similar concerns which were embodied in recommendation number seven of the Committee's report.

As a direct result of the Joint Committee, the Canterbury Forest Trees Bill was introduced into Parliament in 1871. The planting of one acre of forest trees entitled the landowner to a two acre grant of Crown Land. The bill was an incentive scheme which bore some similarities to the much abused United States Timber Culture Act of 1873 (McIntosh, 1975). O'Neill took the opportunity to restate his views on wasteful use and flood damage. He was joined by Reid who asserted that "It would be well if the mover (Sir John Hall) were to direct his attention to the preservation of the existing forests" (NZPD, 1871, 10, 461). Hall claimed to agree with these points but argued that their inclusion would jeopardise the passage of the Bill[4] by making it too radical.

3.6.4 The lapsed Conservation of Forests Bill of 1873

Two poignant pleas for forest conservation were made by Charles O'Neill, a supporter of Potts in 1868, who in 1872 urged action on the basis of the information collected in response to the 1868 motion. His concern was with timber supplies, especially in view of the planned

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4. Enacted as the Forest Trees Planting Encouragement Act, 1871, with provisions extended over the whole of New Zealand.

public works programme and the first signs of scarcity, which in O'Neill's opinion, were already apparent. In 1873 the Committee on Colonial Industries (AJHR, 1873, I4) invited the provincial governments to make suggestions on how best to prevent waste in the indigenous forests. The lack of response, only Otago replied in any detail, prompted O'Neill to again raise the question of forest conservation near the end of the 1873 session. He drew on forest conservation efforts in Victoria and other examples of the dangers of deforestation used by Marsh, but failed in an attempt to have a Royal Commission established to investigate the forests question. The Government spokesman, Donald McLean, replied that a Bill had been prepared during the recess but was not introduced because of the heavy parliamentary timetable. He agreed that the problems of flooding and reduced rainfall caused by deforestation required attention.

The never introduced Conservation of Forests Bill of 1873, or to give its full title, "An Act to provide for the Preservation and Growth of Timber on Crown Lands", represents the first general Government response to the problems facing forest resources. As its longer title indicates, the bill was limited in scope, being an attempt to introduce uniformity and efficiency into timber licensing and timber reserve systems. It allowed the Provincial Superintendents to reserve crown forest land both for and from cutting. The Superintendent could issue timber licenses and leases. The latter were to be allocated by auction to the highest bidder. Leases were required to cut all timber fit for use and to prevent unnecessary destruction of growing timber and the spread of fire. In return Leasees received exclusive rights to the area. Forest conservators were to be appointed to police the act. In essence the bill sought to achieve efficient exploitation of forest resources.

In reply to O'Neill's questions, McLean promised that the Government would "look into the matter during its recess, with the view of 'introducing a bill' (NZPD, 1873, 15, 1546). McLean's actions have been dismissed as "no more than the vague promise that the Government would look into the matter" (Wynn, 1979, 182). However, this evaluation was reached without any reference to the lapsed forest bill of 1873 or to a cabinet memorandum on forest conservation prepared by McLean in March 1874. This document, discussed in Cabinet that same month, is tribute to the sincerity of McLean's reply to O'Neill in 1873. Here McLean wrote that "he was now desirous that the matter should be taken in hand with a view to the adoption of some measure" (11.3.74 F10/1). He suggested that "authentic information" was required on the systems by which forest lands were cut, the effectiveness of the penalty clauses in the Crown Lands Act, 1862, and a return of the numbers of prosecutions. The dearth of information reveals the recency of concern for forest management in New Zealand. McLean outlined a number of steps to ensure improved forest management, these included:

1. obtaining the services of a qualified forester from one of the Forest Conservancies in India

2. all penalties for the destruction of timber should go to a fund for tree planting

3. wherever possible uniform regulations should be enforced for the disposal of timber on Crown Lands.

He linked forest preservation with "the conservancy of rivers." Although he appeared to accept a link between deforestation and flooding, the memorandum emphasised rivers as transport routes. He was however, insistent that some action was required:

> "While it is obvious to all that Forests and Rivers constitute a most important part of the natural resources of the Colony there is yet an aptitude to overlook the necessity which exists for their preservation"
> (11.3.74 F10/1)

Marginal notes on the memorandum indicate that it was seen by Vogel and that the "Premier (is) to get Bill Drafted".

3.6.5 The Timber Floating Act, 1874

The Timber Floating Act, 1874 was concerned with settling conflicts between bankside landowners and timber cutters where land was inundated by floods caused by the damming and release of log-filled creeks. The act and discussion surrounding it is of interest because it encapsulates wider attitudes towards environmental modification. The Timber Floating Bill was precipitated by a court injunction of a downstream landowner being used to prevent logs being driven along a stream (Simpson, 1973, 101-104). After its first reading the bill was referred to a Select Committee for further consideration. The minutes of evidence and report of the committee (AJHR, 1873, I2) focus on two main issues: the efficiency of timber floating and the damage caused by this means of transporting logs. Timber floating was a favoured means of moving logs to mill sites in the north of New Zealand. Logs were cut and rolled into creeks and left for the seasonal floods to float them to the mill, or the water was dammed and then released. A prime concern of the Select Committee was securing a reliable opinion as to the efficiency of this method of transportation. A range of views were heard on the viability of tramways, damage done to logs through being left in water, and the extent of losses through their being washed out to sea. The Select Committee considered that injunctions preventing timber floating were likely to be abused with consequent injury to an important industry, but recognised that in areas where settlement was progressing log driving required regulation, as injury to land was likely. The discussion of the report in the House was centred around concerns of Maori landowners about a loss of rights in

favour of the sawmillers and over damage to eel weirs.

Julius Vogel was Chairman of the Select Committee on Timber Floating and spoke during the debate on the Bill. Vogel's position is interesting, bearing in mind his stance on the forests question in Otago and in response to Potts' Motion in 1868. He thought that if timber floating was not allowed the forests of inland Auckland would remain inaccessible and be an economic loss to the country. The result would be a loss of employment in the timber industry and additional costs through having to secure timber from other sources, especially as "Timber all over the world was becoming scarce" (NZPD, 1873, 15, 1010). Here Vogel is still arguing in terms of timber supplies.

The Select Committee minutes and the debate provide some indications of landscape modification wrought by log driving and the general attitude to this type of environmental impact. The Honorable John Taylor claimed that,

> "There is no possible injury inflicted by the passing of the Bill, because the forests were situated principally at the heads of streams, where at the foots there was very little agricultural land available"
> (NZPD, 1873, 15, 1173)

Others took a contrary view, especially of the damage caused by the flood of water and logs when a dam was released. The Honourable Captain Ballie recalled a case where,

> "in consequence of the rush of water from one of these dams £300 worth of property was damaged in almost as many minutes. His potato crop was swept away, his garden was destroyed and the ground was covered with stones and timber"
> (NZPD, 1873, 15, 1173)

This statement gives some idea of the type of rapid environmental modification that occurred as a consequence of timber floating. Equally important is the attitude it revealed. Some observers did not see this as at all disruptive, while others expressed concern, but not at the environmental damage. Rather, it was the abuse of private

property rights that held attention: one settler's "improvements" could be wiped out by the actions of another.

3.6.6 Julius Vogel's Bush Settlement Proposals

Premier Julius Vogel, in his earlier responses on the forests question, showed himself to be concerned with efficient utilization of timber supplies. Government borrowing, large scale public works development and migration schemes are also intimately associated with his time as Premier.

The forest was at the interface between primeval nature and settlement. Typically it was valued most for its underlying soils - to be converted to pasture. Vogel's memorandum of February 1874 addressed to the Superintendent of Wellington Province was concerned with the more effective use of forest resources (AJHR, 1874, H5). This was not a novel idea: Kelly had advocated a forestry sector as an intermediate income earner for settlers converting bushlands to pasture in 1873 (NZPD, 1873, 15, 861-863) and similar views were later expressed by Kirk (1878). Vogel's bush settlement proposals were intended to achieve efficient economic use of forest resources through ending wasteful destruction and cutting. Instead, organized milling would clear the land for settlement and provide a livelihood for settlers in the transition from forest to fields. The memorandum reveals Vogel's attitude to forests. Essentially he was still only concerned with efficient utilization, but in his introduction of the New Zealand Forests Bill in 1874 it was apparent that his ideas had broadened considerably.

3.6.7 The New Zealand Forests Act 1874

A New Zealand Forests Bill was introduced into Parliament by

Premier Julius Vogel in 1874. This Bill was a comprehensive and innovative response to the question of forest management. Reasons for introducing the Forests Bill at that time may be grouped as immediate and detached, specific and general. Vogel admitted that the forests question had only recently attracted his attention while on a tour of the South Island during the 1873-1874 parliamentary success. Thus Wynn observes,

> "suddenly in 1874 that most talented of early New Zealand politicians, Julius Vogel, now Prime Minister, adopted the cause of forest conservation"
> (Wynn, 1979, 182)

It seems reasonable to accept Vogel's statements that his direct encounter with landscapes in which wasteful cutting, fire, flooding and deforestation had occurred, aroused his enthusiasm for forest conservation. Equally there were less immediate factors bearing on his interest in forests.

Although settlement and "improvement" were dominant motifs, ideas developed in the 1860s from local and overseas experience emphasised a potential timber famine, the influence of forests on climate, and on flood protection as well as the displacement of the indigenous flora. That is to say, there was a wider set of attitudes and perceptions of forests. Many of these ideas were expressed during the debate on Vogel's Forests Bill.

Besides, forests and forest conservation issues had been intermittently raised in Parliament since 1868. Vogel in fact was unwittingly a participant, and frequently a hostile one, in the more significant discussions on the forest resources of the country. Thus he had a fairly well defined viewpoint upon which his conversion to forest conservation was built. Vogel's South Island tour in 1873-1874 awakened him to the waste and damage caused under existing systems of forest management. Some solutions were placed before him shortly

afterwards through the intervention of the Governor, Sir James Fergusson who had previously served in India; the hub of Imperial forestry in the nineteenth century (see Chapter IV). Fergusson secured a copy of a report on forest management in Germany, Austria and Great Britain by an Indian Forester, Captain Inches Campbell Walker, as well as seeds of forest tree species from the Government of India (G 13/4 No 38, No 43). Campbell Walker's papers summarized European work into scientific forestry based on the sustained use of forests. His interest whetted, Vogel opened a correspondence with the Governments of India, South Australia and Victoria on the subject of forest legislation (IA 1/1874/1356). The American Association for the Advancement of Sciences' 1873 report on the Cultivation of Timber and the Preservation of Forests and copies of the Timber Culture Act, 1873 were also obtained via Fergusson (LE 1/1874/133).

Why did Vogel show such interest in forests? Wynn argues that, "the immediate cause for the introduction of the New Zealand Forests Bill in 1874, however, was Julius Vogel's acceptance of the conservationists arguments" (Wynn, 1979, 187). This stance requires reconciliation of Vogel's public works development strategies with his Forest Conservation Bill, something Wynn successfully achieves. However, if the lapsed Conservation of Forests Bill of 1873 and McLean's promises to parliament are considered, the emphasis is altered somewhat. Clearly the Government had already made a commitment to introduce new forests legislation in 1873, but had been prevented from doing so by a heavy parliamentary timetable. It is conceivable that a similar bill could have been resurrected for 1874. Thus, arguably, the impetus for forests legislation borne of the failings of timber licensing was already there. In these favourable circumstances, Vogel's recently heightened awareness of environmental modification and

exposure to scientific forestry literature were permitted to develop into an innovative piece of legislation which went far beyond the rather narrow limits of the lapsed 1873 bill.

Vogel introduced the bill in a lengthy speech which displayed evidence of considerable reading on all aspects of the forests question. Simultaneously he tabled a substantial paper containing reprints of previous references to the forests question in New Zealand and reports from Victoria, South Australia, Ceylon, Europe, Britain, and India (AJHR, 1874, H5). Commenting on his tour of the South Island during the recess, he claimed,

> "It then forcibly presented itself to my notice how very large was the demand for timber which arose from our railway works and our telegraphic construction and maintenance; how very great were the injuries caused by floods and how much deterioration our climate was liable to sustain from the destruction of forests"
> (NZPD, 1874, 16, 75)

He then addressed the forests question, emphasising the importance of preserving forests and the consequences of their destruction, the fallacy of inexhaustible timber supplies, and forestry techniques and legislation. Major points were illustrated with reference to European and American developments. Using estimates of deforestation provided by James Hector (Table 3.4), dating from Potts' 1868 motion, Vogel then directed attention to the New Zealand situation. Hector's data were based on estimates rather than a detailed field reconnaissance. Consequently, opponents criticised Vogel on the grounds that the data exaggerated the extent of deforestation. However, broad regional trends are probably accurately revealed. On the basis of these estimates Vogel argued that there was a need for immediate action and that the extent of remaining Crown lands provided an opportunity for establishing State Forests that was not open to widely settled countries.

Table 3.4

JAMES HECTOR'S ESTIMATES OF RATES OF DEFORESTATION

Province	Percent deforested 1830-1868	Percent deforested 1868-1873	Estimated forestland 1873 (acres)
Auckland	59	27	1 200 000
Taranaki	10	11	1 600 000
Wellington	20	25	3 000 000
Hawkes Bay	61	31	250 000
Nelson	17	20	2 000 000
Marlborough	13	29	500 000
Canterbury	10	33	180 000
Westland	5	21	1 500 000
Otago	12	11	1 900 000

Source: AJHR 1874, H5.

The preamble indicated the two-fold purpose of Vogel's Bill:

> "to make provision for reserving the soil and climate by tree planting, for providing timber for future industrial purposes, for subjecting some portion of the native forests to skilled management and proper control"
> (NZB, 1874)

and to ensure that,

> "The revenues derivable from such forests should be specially dedicated to meeting and discharging so much of the public debt of the Colony"
> (NZB, 1874)

Vogel's bill provided for £10 000 for ten years to be spent on forest management. This included expenditure on planting, improvement of access to forests, land purchase, rentals, education of foresters, the establishment of a forestry school and of nurseries. After a decade Vogel believed forest revenues would be sufficient to contribute to the consolidated fund. A minister to be known as "the Commissioner of State Forests" was to be appointed along with a conservator of forests and two assistants. The forest estate was to be selected within five years by the Commissioner. The total acreage was not to exceed three per cent of the area of each province, although a trailer was added to the effect that lands "principally devoted to agriculture" or "available for gold mining" should not be taken.

Some 34 of the 78 members of the House spoke on the bill during its second reading. The discussion highlighted the prevalent attitudes towards environment in terms of reckless use of resources, displacement of the indigenous flora, plantations, climatic changes induced by diminished forest cover and soil erosion, and flooding. The validity of the estimates of deforestation presented by Vogel were challenged and, despite his efforts to present the bill as a facet of natural resource development, it was opposed by some as prejudicial to the interests of settlement.

John Sheehan claimed that forestry efforts would fail because,

> "any attempt to preserve native timber in New Zealand will result in failure. It is impossible it should be otherwise. I cannot explain the reason: but the same mysterious law which appears to operate when the white and brown races come into contact - and by which the brown race sooner or later, passes from the face of the earth - applies to native timber. Whenever grass, clover, and European plants and animals find their way into the bush, the forest begins to decay away, and soon assumes a ragged and desolute condition"
>
> (NZPD, 1874, 16, 351)

Wynn describes this as "an exuberant metaphor" (Wynn, 1977, 128) but against the wider background of displacement ideas this was not the case.

Similarly, forest influences on climate received considerable attention during the debate. But, to indicate that there was "circuitous and confused discussion of the climatic consequences of deforestation" (Wynn, 1979, 184) is to seriously underplay the importance of these ideas in the nineteenth century. The mechanisms and not "the fact" of forest influences were in debate.

However, the issue behind much of the criticism of the bill was not related to forestry questions but to the clash of interests between provincialists and centralists in the General Assembly. William Fitzherbert, The Superintendent of Wellington Province and a staunch provincialist claimed that,

> "the real intention and meaning, and scope of this Bill is not the conservation of the forests of New Zealand, but to take their lands from the Provinces"
>
> (NZPD, 1874, 16, 378)

William Rolleston of Canterbury was another who was equally critical of the bill because it would, "cripple provincial institutions in a way ... deleterious to the interests of the people of the provinces and of the colony" (NZPD, 1874, 16, 406). Thus, an effort to improve forest management which recognised both timber supply and protection values met with political opposition for reasons not concerned with its own merits but because of a fundamental clash of opposing political

groupings.

In its final form the Act was shorn of many of its original clauses. The most important omission was that of the three per cent of each Province being available as State Forests. Instead, the provincial superintendents could request areas be set aside as State Forests. This effectively made the Act voluntary, depending on the attitude of the Superintendent, unlike Vogel's original proposal whereby the Commissioner would select lands for State Forests. Most of the other omitted clauses related to arbitration between provincial authorities and the Commissioner over disputed forest lands. Still, £10 000 annually was to be made available for forest management. It remained to attempt to implement the new legislation.

3.7 SUMMARY

The New Zealand Forests Act, 1874 was the first wholly special purpose forest legislation to be enacted in the colony. To fully appreciate the significance of this Act as a step towards more sophisticated forest management, both its general and specific contexts should be understood. Important dimensions of the wider social and physical context include the primacy of settlement and "improvement", ideas about the inevitable displacement of the indigenous flora, as well as forest influences on climate and flood prevention. From this pool of wider environmental attitudes three rationales for forest protection emerged. These however, were all secondary to settlement goals. They may be summarized as "protection forests", to combat floods and improve the climate; "production forests" to meet future timber requirements; and "restoration" forestry, namely tree planting for both protection and production purposes. The "protection" and "restoration" rationales were newly introduced by the 1870s. The case for new forest

protection measures was advocated in Parliament by a small circle of educated, naturalist-politicians. This leads to the more specific context.

By the late 1860s, most existing systems of timber licensing as a means of regulating the exploitation of Crown forests had proved ineffective. One option was to attempt to improve the system by increasing the efficiency of its operation. This most likely would have involved effective policing of the regulations by a trained staff. A second option was to institute a quite new system of forest management. The lapsed forest conservation bill of 1873 was in tone, clearly an attempt to refine the timber licensing system. It was an example of official thinking lagging behind, for Potts and others had introduced new appreciations of environmental modification and the role of forests in these processes. These suggested additional rationales for forest protection. By 1874, his awareness triggered by a tour of the South Island, Vogel took some of the ideas of Potts and Travers, melded them with a rapid perusal of European and Imperial forestry literature and produced a New Zealand Forests Act that differed radically in intention from the timber licensing regulations. Vogel's bill instituted forestry as a sustained landuse; it also acknowledged the forests contribution to flood control and climatic amelioration. Although Vogel's views on forests were not original, the Forests Bill was innovative and displays his characteristic enthusiasm. However, timing was important, for, although Vogel's proposals were bold, they were made at a moment when the government had already made a commitment to introduce new forests legislation.

In most respects the events and attitudes highlighted, as well as the conclusions reached, in this chapter are in agreement with those of Wynn (1977, 1979). In a broadly synchronic examination he

neatly explores the peculiarities of people and places in nineteenth century New Zealand. His treatment carefully integrates Vogel's Forests Bill into the wider provincialist versus centralist political struggle of the 1870s. Similarly he clearly views Vogel's reconciliation of development with forest conservation.

There are, however, some points which Wynn's research leaves untouched. This chapter emphasises some of these. For example, a diachronic viewpoint that takes timber licensing in the 1850s as a starting point, as is the case with Chapter II, provides a different perspective. The events of the 1870s may be regarded as much the products of the failure of timber licensing as solely new appraisals of man and environment derived ultimately from Marsh's Man and Nature. The lapsed Forest Conservation Bill of 1873 was clearly framed within the terms of timber licensing. Similarly, McLean's cabinet memorandum of 1874 shows that the forests issue was going to be considered by Cabinet in 1874. In this light Vogel's Bill appears not as an initiative but more as a response. A further problem of Wynn's viewpoint is the tendency to disregard displacement and forest influence utterances in response to Vogel's Bill when a broader perspective suggests that they were part of contemporary understanding of environmental changes.

Overall however, the New Zealand Forests Act emerges as the first significant response to the question of forest management. It remained to put it into effect.

CHAPTER IV

A PROFESSIONAL APPRAISAL: CAPTAIN INCHES CAMPBELL WALKER, CONSERVATOR OF FORESTS, 1876-1877

4.1 INTRODUCTION

The New Zealand Forests Act of 1874 provided for forest management on a national scale. Physical expression of the Act waited upon the appointment of a Conservator of Forests and the organization of a Forests Department. The first steps were taken in 1875 when Vogel, while visiting Britain, secured the services of Captain Inches Campbell Walker, a forester from India. Campbell Walker arrived in New Zealand in 1876. Although his tenure as Conservator of Forests was short lived, 1876-1877, it marks the initial attempt to establish scientific state forestry in New Zealand. Documents pertaining to the appointment of Campbell Walker allow some insights into his professional background and abilities. His personal convictions about the value of scientific State Forestry are evident from various papers and reports. His writings are also the first examples of a particular type of scientific appraisal of the New Zealand environment; that of the professional forester. In them a different attitude to environment and resources is revealed. Campbell Walker proposed the sustained harvesting of the resource and "climatic forest conservancy", that is flood prevention and protection of water supplies. Unlike botanical observers, his viewpoint is involved not detached; he was concerned with facilitating active utilization of forests for timber and retention of other areas for flood prevention and climatic amelioration. In contrast to those favouring agricultural development, he proposed State Forestry as a permanent, planned land-use. State Forestry was regarded both as unwelcome State interference

and a direct threat to the spread of settlement because it was thought that it would slow down or terminate the alienation of large tracts of forest land.

The rest of this chapter is organised around the circumstances surrounding the appointment of Campbell Walker, his tour of inspection and subsequent reports, public reaction to him and the Forests Act of 1874, and an assessment of Campbell Walker's appraisal of Forest resources.

4.2 CAPTAIN INCHES CAMPBELL WALKER APPOINTED

Donald McLean in his cabinet memorandum addressing the forests question suggested that the New Zealand government obtain one or more "able and qualified men who had served some time in the Forest Department in India" (11.3.74 F10/1). Vogel's Forests Act of 1874 provided for the appointment of a Conservator of Forests. At this time scientific forestry had only developed to any extent in Europe, particularly France and Germany. Trained German foresters had been employed from the 1860s to administer the Indian forests.

A myopic assertion was made by some parliamentarians, who lacked any understanding of scientific forestry, that local appointees could best undertake forest management because European forestry experience would be inappropriate in the New Zealand environment. This was not the only occasion on which New Zealanders saw themselves as living under unique circumstances in a distinctive environment. The post of Conservator of Forests remained empty, until Vogel, in Britain to raise a £4 000 000 Government loan, secured the services of Captain Inches Campbell Walker, Acting Conservator of Forests in the Madras Conservancy, to fill the position. Campbell Walker's employment came about through contacts established between Vogel and Inches'

brother Arthur:[1] both were whist enthusiasts. Brown and McKinnon (1966,5) see this connection as central: "a result of the meeting of two whist enthusiasts was the appointment of Inches Campbell Walker as Conservator of Forests." This view over-simplifies events. Vogel received general advice on forest management from Arthur Campbell Walker who stressed the importance of forest demarcation, the appointment of officials to maintain boundaries and police the areas, and a specialised full time staff to "work your forests as to ensure a permanent and increasing yield" (Arthur Campbell Walker to Vogel 8.2.75 F10/1). Vogel also used the occasion to follow McLean's suggestion of a year earlier and inquired as to the possibility of obtaining for a year the services of an Indian forester.[2] From this, Inches Campbell Walker's appointment ultimately followed. Vogel's contribution to forest management had been to formulate the legislation; neither his expertise nor perhaps his interest extended beyond this point to the administrative details of putting the Forests Act into operation. Hence Arthur Campbell Walker's insistence that specialist foresters were needed to undertake forest conservancy, when Vogel did not seem to have really considered the question. In view of the shortage of forestry officers in India, Arthur Campbell Walker suggested that German trained foresters could be more readily obtained. Brandis, a botanist, and Schlich and Ribbentrop, two fellow German foresters, initiated scientific forestry in India in the 1860s. The latter two were selected by Arthur Campbell Walker (8.2.75 F10/1).

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1. Also an Officer in the Madras Forest Service.

2. Arthur Campbell Walker's reply was prophetic: "Such a temporary arrangement would give you interesting reports, but would not advance the administration of your Forests to any extent" (Arthur Campbell Walker to Vogel 8.2.75 F10/1).

At this point, the role played by Sir James Fergusson, a former Governor of New Zealand (June 1873 to December 1874) now residing in Britain, again assumed some importance. Earlier, in March 1874, concurrent with the discussion of McLean's Cabinet Memorandum, Fergusson had written to the United States enquiring about forest planting and conservation. Copies of the Timber Culture Act of 1873 and the American Association of Science Report to the House of Representatives on the cultivation of timber and preservation of forests were subsequently received (LE 1/1874/133). Fergusson's interest in forestry and his earlier connections with India, as Under Secretary for India in the British government of 1866, led him to introduce Vogel to the Secretary for India (Fergusson to Vogel 15.2.75 F10/1). Efforts to locate Dr Brandis were unsuccessful. It is unclear whether Fergusson was taking the initiative or merely responding to an earlier request by Vogel. However, behind the scenes, Fergusson made an important contribution by providing details on the backgrounds and credentials of various parties and arranging meetings for Vogel.

In March 1875 Captain Inches Campbell Walker through his brother expressed interest in the position of conservator of forests in New Zealand. Presumably Arthur Campbell Walker was responsible for drawing the possibility to his attention. The official offer followed in May of 1875 and was accepted in the same month (AJHR, 1875, H18).[3]

Although Inches Campbell Walker was not known personally to Vogel before the appointment, his paper on forest management in Europe was amongst those in the return on forest conservation originally secured by Fergusson (G 13/4) and tabled by Vogel in conjunction with the New Zealand Forests Bill, 1874 (AJHR, 1874, H5). A fortuitous

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3. Negotiations were complicated by the difficulties in arranging Campbell Walker's leave of absence without loss of his service benefits.

meeting between Vogel and Arthur Campbell Walker was important, but the interest and contacts of Sir James Fergusson and Vogel's familiarity with Inches Campbell Walker's writings contributed to the appointment.

Inches Campbell Walker after his New Zealand sojourn resumed what was to become a lengthy and distinguished career in the forest service in India (Brown and McKinnon, 1966). His first involvement with Indian forestry dated from its origins in the 1860s (Donald, 1927, Peree, 1929, Winters, 1975). One superior described Campbell Walker to Vogel as,

> "a pushing active, intelligent man, with a good knowledge of forestry, at least in theory - He has visited the German Forests and made himself acquainted with forest works there. As far as I know he cannot have had much experience in plantations. He did not seem either from what he told me, or from his published writings, to have much cared for the rough life in the German forests"
> (Lieutenant-Colonel Pearson to Julius Vogel 17.3.75 F10/1)

Pearson[4] also alerted Vogel to the possibility of attracting French or German trained foresters whom he described as "very able men". He also hinted at two weaknesses in Campbell Walker as a forester; a lack of practical experience and a limited knowledge of plantations. However other contemporary opinions and Campbell Walker's own actions in New Zealand all suggest that he was an able forester.

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4. One of his general observations showed considerable insight:

> "Though quite ignorant of the New Zealand forests, I can forsee that it will be no easy task to manage the arrangements for their conservancy satisfactorily - chiefly because Forest conservancy is always unpopular with the public in all countries, and from the impossibility of showing definite returns within a moderate time, it is likely to be specially so in a new country where events are expected to march rapidly."
> (Lieutenant-Colonel Pearson to Vogel 19.3.75 F10/1)

4.3 CAMPBELL WALKER'S INSPECTION TOUR 1876-1877

Soon after his arrival in New Zealand, and after consultation with Vogel, Campbell Walker decided to spend the twelve months of his appointment on a familiarisation tour of the colony. His intention was to gain an understanding of the climate, timbers, forest attributes, and public feeling towards State forestry in New Zealand. The inspection was deemed necessary because of the dearth of suitable information on forest resources.

Accordingly, aided by Professor Thomas Kirk, a tour itinerary was drawn up. On the passage of the Forests Act Kirk had emphasised to Vogel the necessity of studying the growth rates of indigenous forest flora, warned of the problems confronting a conservator fresh from Europe and offered his services to the government (Brown and McKinnon, 1966, 4-5). Campbell Walker, assisted by Kirk, toured all the major forest areas (Figure 4.1) on both islands. In all he spent 215 days in the field. A more detailed breakdown of his routes and stopovers is provided by Table 4.1.

Campbell Walker produced a report (AJHR, 1877, C3) and two papers read before the Otago Philosophical Society and the Colonial Museum in Wellington in 1876 and 1877 respectively. In the assessment of two twentieth century professional foresters the reports "showed his technical competence and ... with minor variations would be as pertinent today as then" (Brown and McKinnon, 1966, 16). These various papers are concerned with five major questions:

1. making a case for State Forestry
2. assessing the condition and future of the sawmill industry
3. emphasising the limited role of exotic plantations
4. stressing the importance of "Climatic considerations" as a motive for State Forestry

Figure 4.1

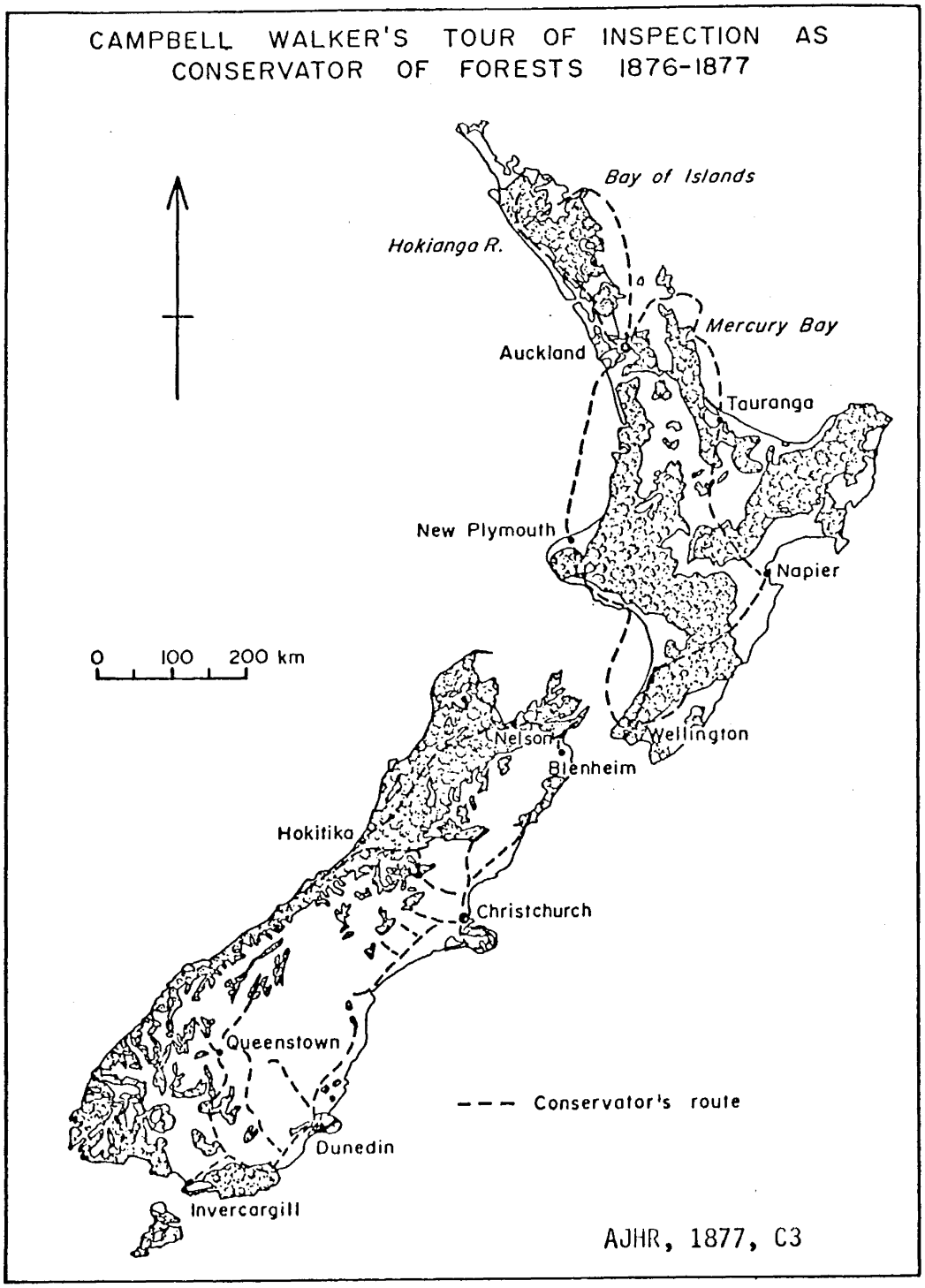
CAMPBELL WALKER'S TOUR OF INSPECTION AS CONSERVATOR OF FORESTS 1876-1877
Bay of Islands
Hokianga R.
Ia
Mercury Bay
Auckland
Tauranga
New Plymouth
Napier
0 100 200 km
Nelson
Wellington
Blenheim
Hokitika
Christchurch
Queenstown
Conservator's route
Dunedin
Invercargill
AJHR, 1877, C3

Table 4.1

CAMPBELL WALKER'S TOUR OF INSPECTION, 1876-1877

Time	Travel Details
3 May	Arrive in New Zealand (Wellington) depart for tour of Rimutaka Ranges
19 May	Depart for Auckland
25 June	Depart from Thames for Kaipara, Hokianga and Auckland
1 August	Depart for Canterbury
15 September	Masterton
19 September	Return to Wellington, hampered by flooding
21 September	Depart for Foxton, Palmerston North, Napier and Auckland
20 October	Arrive in Taranaki
30 October	Depart for Wellington
4 November	To Canterbury until 28 November
December	To Otago
19 January	To Westland
February	Arrive in Nelson, continue to Blenheim and Christchurch
3 March	Arrive Wellington

Source: AJHR, 1877, C3.

5. the organisation of Forest management in New Zealand.

In his attitudes and appraisal of forest resources he espoused the rationales and scientific viewpoints current in European and Indian forestry during the mid-late nineteenth century.

In making a case for State Forestry, Campbell Walker contrasted the goals of private and governmental efforts. Whereas private forestry was purely an economic operation involving maximisation of output in the minimum time, State Forestry was for the benefit of present and future generations (Campbell Walker, 1876a,187). From a conceptual viewpoint State ownership of forests may be regarded as an end point on a progression from communal to private property rights as discussed by Desmetz (1967) and previously referred to in the analysis of timber licensing systems (see Chapter II). Campbell Walker considered the large scale and long term nature of forestry justified State involvement:

> "the only reason for State or Government interference and direct action is that damage to forests cannot be repaired in a day, nor can they once destroyed, be replaced in a year like a crop of wheat"
> (Campbell Walker, 1876a,202)

He was aware that this view point was contrary to free enterprise arguments then in vogue. Indeed, he referred to government involvement as "interference" but felt that State controlled scientific forestry was in the best interests of the welfare of the total community present and future. By "scientific" forestry, he meant the conversion of tracts of natural forest into blocks of quality timber trees of similar ages capable of being worked in rotation, with the aid of working plans. This would allow sustained use of the indigenous forest. Cleared areas would be left to regenerate and stands would be cut to provide a continuous supply of timber as they attained maturity. However, State Forestry extended beyond timber production:

"the State Forester has also to think of climatic considerations and the permanent supply of timber" (Campbell Walker, 1876a, 189). It was especially for these reasons, outside the calculations of entrepreneurs, that Campbell Walker argued for State Forestry over private forestry.

To further support his case for State Forestry he attacked the idea of inexhaustible forest resources and the belief that forests could be best protected by alienation. Quite unequivacably, he stated:

> "No forest is inexhaustible unless systematically worked on principles which ensure the capital is not being trenched upon and the income alone utilized"
> (AJHR, 1877, C3, 10)

Campbell Walker was concerned to achieve sustained yields from the forest resource. On the basis of his tour of inspection he considered that,

> "there is no prospect of a dearth of timber or injurious effects from clearing, for the present or in the immediate future throughout the Colony, except in the Canterbury Plains, the Otago Gold Fields district, and perhaps the Waikato"
> (AJHR. 1877, C3, 10)

Nevertheless he insisted it was the duty of the Government to take prompt steps to manage the forest resource.

Campbell Walker dismissed as a fallacy the argument that if forestry was profitable "private individuals may be trusted to do it in their own interests" (Campbell Walker, 1876, 189). Drawing upon the French example of coppice[5] versus forest systems, he noted that the reduced capital, smaller land requirements, and shorter rotation period of the former resulted in their adoption, even though this was less profitable for the owners in the long term. From another perspective

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5. Coppice systems involved the periodic cutting over of tree shoots for use as poles and posts.

State Forestry was also justified because it ensured future supplies which private involvement could not, as the owners were concerned with their own profits.

Campbell Walker's response to the sawmill industry was interesting, if only because initially it seemed a little unexpected in view of some of his views on State Forestry. He was less concerned about the possibility of a "timber famine" than were other contemporary observers (eg. Hay, 1872, Firth, 1874, Kirk, 1878). Perhaps Campbell Walker's optimistic approach was based on his faith in the accomplishments of scientific forestry. He did not see forest resources as being "locked up" but utilised in an efficient manner organised by the state. Campbell Walker, however, did express some reservations about the nature of the sawmilling industry. He identified wasteful use of timber as one of its special features. Other distinguishing attributes included the "universal use of the tramway" (AJHR, 1877, C3, 40)[6] and the efficiency of the plant of sawmills. The majority of mills were steam powered although a few used waterpowered equipment. On the basis of his knowledge of Indian and European sawmill equipment, he favourably compared New Zealand with its overseas counterparts:

> "I consider they are generally eminently adapted for the work they have to do, and the greatest boon to the settler and general public in providing a supply of sawn timber ready it may be said, at everyone's door"
> (AJHR, 1877, C3, 40)

The major problem, in Campbell Walker's opinion, was wasteful timber conversion and sawmilling practises that hindered natural regeneration in cutover areas. Forests were being "mined"; the forest capital and not the interest was being used. He felt that scarcity

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6. He did acknowledge that timber floating was common practise in Northland and occasionally found in Otago.

and increasing inaccessibility of forests would eventually reduce wasteful use through increased costs forcing millowners to cut and convert timber more efficiently. Such a course would ultimately lead to a shortage of timber supplies. Campbell Walker did not consider plantations to be a viable alternative, consequently he urged State intervention through the leasing out of forest lands as they were required for timber supply purposes or the requirements of settlement. This position, of slow and deliberate release of the public domain, was in marked contrast to the general attitudes towards land and resources held by contemporary settlers, sawmillers, and politicians.

Exotic plantations were a prominent landscape feature of the Canterbury Plains soon after settlement began in the mid-nineteenth century (Clark, 1949, 359-377). In 1871 legislation had been passed to offer incentives for individuals to plant forest trees (see Chapter III). Campbell Walker reacted somewhat unfavourably to the afforestation incentive scheme as it existed. He correctly recognized the exaggerated nature of claims about the area planted under the 1871 legislation. He did not rule out encouragement for tree planting but supported these schemes only where "they would confer a real public benefit" (AJHR, 1877, C3, 37). He levelled a number of specific criticisms at the Forest Trees Planting Encouragement Act, 1871. Most important was the regional differentiation in land prices which made the uniformly applicable financial incentive unrealistically favourable in some localities. This claimed Campbell Walker, would only encourage "ornamentation of a private property or residence, or the gratification of a hobby on the part of an individual" (AJHR, 1877, C3, 37). He proposed adjusting the level of the incentive and implementation of tighter controls on plantations. These included, assessment of the suitability of the area to be planted, approval of

the chosen species, and inspections for the first three years.

Campbell Walker saw only a small place for State involvement in plantations - restricted to the treeless areas of Canterbury, Otago, and perhaps parts of Auckland province. With the exception of limited incentive schemes in the treeless regions he did not apply to plantations the arguments used in support of State Forestry. Campbell Walker was prepared to let plantations be governed by market forces. In his view timber supplies could be met from indigenous forests and State expenditure was thus not justified. Campbell Walker made no reference to the shelterbelt function of plantations. Perhaps his short time in New Zealand did not allow him to appreciate their value in this regard.

A superior Officer in India, Lieutenant Colonel Pearson, had suggested in a letter to Vogel (19.3.75, F10/1) that Campbell Walker lacked knowledge of plantations. Certainly they played only a small role in Campbell Walker's assessment of the situation in New Zealand, but in this respect he was being consistent in his thinking. Campbell Walker saw inefficient use of the indigenous forests as the central problem. With systematic management he believed the indigenous Forests could meet timber supply requirements for the future as well as perform "climatic conservancy" functions. Replanting, because it was time consuming would involve a considerable area, be expensive and could not achieve these goals. Thus in his view the indigenous forests should be managed by the State and any plantations generally be left to private enterprise.

Campbell Walker took care to explain the importance of "climatic conservancy" as a rationale for State Forestry. This was a viewpoint unfamiliar to many in the community. He stressed that some catchments had minimal value for the timber standing on them, but performed an

important role in protecting against flooding and in ameliorating the climate:

> "The timber is not of much value on the upper portions, so that you should not conserve it for that; but I would on no account allow it to be cleared, and whatever may be taken out should be on the system known as 'selection felling' or removal of individual trees"
> (AJHR, 1877, C3, 48)

In his assessment of the magnitude of flood damage from forest clearance contemporaries such as W. T. Locke Travers. Although aware of claims that the increased frequency of flooding in the Hutt River following forest clearance, Campbell Walker claimed, "I do not see any good ground for the inferring that any damage has as yet taken place from the clearing away of forests" (AJHR, 1877, C3, 48).

Campbell Walker was sensitive to the possible conflict of interests between settlement and what he termed "climatic forest conservancy." He acknowledged that it was natural for settlers to wish for clearance and acquiesced to this on lowlands provided that forest utilisation was efficient. However he insisted that upland forests required supervision by a central authority. This he considered was justified because of the inevitable damage to the total community from the consequences of upland forest clearance which was sufficient to warrant constraining individuals in their desire to settle there:

> "I should view with very greatest anxiety any clearing of the hills which form the dividing range or back-bone of the island, and am convinced that it would be followed sooner or later, by the most disastrous results, both in the shape of deterioration of the climate, dangerous floods and drying up of springs and sources of rivers"
> (AJHR, 1877, C3,48)

Campbell Walker emphasised "climatic forest conservancy" to protect against flooding and drying up of streams. He remained wary of the claimed relationship between forests and rainfall that enjoyed widespread popular support:

> "Much has been written on the subject of the influence of forests on rainfall, springs or streams of water, and on the humidity of the atmosphere generally. I do not think we can consider it proved that their existence or non existence influences to any appreciable degree the total rainfall of a district, although they probably do cause the clouds to precipitate their moisture in certain localities"
>
> (AJHR, 1877, C3, 47)

He referred to the discussion of this issue by Marsh in Man and Nature, and to other authors such as Clarke(1876), Hooker, Humboldt, as well as French and German foresters. Campbell Walker's view was in accordance with that of contemporary forestry science; the first empirical studies of forest influences in Europe dated from this period (Lull, 1949). Campbell Walker's own examination of rainfall data in the colony for the 1865-1875 period provided the basis of his contention that there was no clearcut evidence for a relationship between forests and rainfall levels. In his approach to the forest influences question he adopted an outlook typical of the contemporary opinion in forestry circles, but far removed from popular ideas. Interestingly, he did not entirely dismiss the idea of climate amelioration through forest removal and claimed without elaborating on the mechanisms involved that Wellington had benefited in this respect. The view of forestry for the benefit of the community put forward by Campbell Walker was far in advance of the popular conception, which was limited to tree planting. It was made more difficult to accept because of the way in which it clashed with settlement goals.

The report on New Zealand forests was concluded with suggestions for the organisation of forest management. Campbell Walker identified three major requirements:

1. a State Forests Department
2. a new Forests Act allowing the selection and demarcation of indigenous forests
3. a permanent staff of specialised foresters to manage the forests.

Public concern for forest management was limited and at its lower levels tended to favour local control through Waste Land Boards, County Councils, and Roads Boards. Campbell Walker argued that such control was against the trend of overseas experience, that local bodies were ignorant of forestry practises, and further that they were hampered by a limited viewpoint and fluctuating membership. In combination he felt this would render them unable to look to the welfare of future generations in their management of forests. However, his reasonably favourable appraisal of many aspects of the forest industry and forest resources in general, did not reduce and perhaps accentuated the urgency of his plea that forest management was needed immediately or economic and climatic losses would be felt. The necessity for this action seemed so apparent and **the argument** that State forestry was not required so fallacious to him that, "it seems scarcely necessary to refute it" (AJHR, 1877, C3, 50).

Campbell Walker was aware of and sensitive to the land demands of settlement. Disposal of the forest estate was "the most difficult problem" (AJHR, 1877, C3, 52). This was particularly so in the heavily forested North Island. The disregard for forest resources in land clearance by burning led Campbell Walker to assert that the colony was,

> "sacrificing land covered with valuable timber for a few shillings per acre and the prospect of indirect revenue in the future"
>
> (AJHR, 1877, C3, 52)

In his view overly rapid land alienation which neither maximised economic returns nor efficiency of landuse was occurring. Instead he favoured an extension of the forest royalty and lease system of Southland together with the establishment of a special fund for the Forests Department: a percentage of proceeds from the sale of all forest land. Fully aware of the inevitable criticism that he was

advocating measures likely to retard settlement, he even argued in favour of increasing the price of land. The justification for this course of action was that forest land would then be taken up only when occupiers could afford to clear it and dispose of the forest products in a more efficient manner in an effort to recoup costs. Under current practises bushlands were typically cleared by clear-felling and burning with no attempt at utilising the timber.

Vogel had unsuccessfully proposed that three percent of the land area of each province should be set aside as State Forest. Campbell Walker considered this an absolute minimum although he considered that ideal area varied regionally depending on local circumstances. In the European examples that he referred to State Forests covered up to 25 percent of the total land area of the country. He may have had similar hopes for New Zealand but it was doubtless politic to avoid mention of specific acreages. Forest reserves had existed in the 1860s, but those proposed by Campbell Walker differed significantly in conception of their nature (see Chapter II). He emphasised selection and demarcation of forests that were to be worked indefinitely on a rotational basis. Sustained use replaced "mining" of forest resources. To this end, State Forests required the strongest legislative safeguards:

> "The control of such reserved forest should, in fact be absolute and, once duly constituted, they should be inalienable save by act of the General Assembly"
> (AJHR, 1877, C3, 51)

Campbell Walker was concerned with institutionalising forestry as a permanent landuse of present and future benefit to the community. The prevalent view was of indigenous forests as providing a transitional landscape for a sawmill industry and generally a hindrance to the progress of settlement. State Forestry confronted settlement. To many, it also represented an unwelcome instance of State intervention

and had acquired political overtones exceeding its own significance. As a consequence Campbell Walker's report and Vogel's Forest Act received a strongly negative public and political reaction.

4.4 PUBLIC REACTION TO CAMPBELL WALKER AND THE NEW ZEALAND FORESTS ACT

The New Zealand Forests Act, 1874 was not without support beyond parliament. But protagonists were atypical in being generally educated and wealthy and sufficiently insulated from the privations of a frontier existence to be able to entertain and support the measure. One such person was Josiah Firth, a landowner and politician. Firth read a paper entitled On Forest Culture before the Auckland Institute in 1874 soon after the passage of the New Zealand Forests Act. He supported forest conservation for climatic and flood protection purposes using European examples perhaps ultimately though not necessarily taken directly from Marsh's Man and Nature. Firth challenged as excessive the estimates of forest destruction provided by James Hector, the Government Geologist (AJHR, 1874, H5). He did however, accept that "a most reckless and wanton destruction has taken place and is still going on at an increasing ratio" (Firth, 1874, 183). The rest of his address was concerned with plantations. However Firth made passing reference to the recently passed Forest Act: he doubted if it would be effective in reducing wasteful use because, it "failed to secure authority to take the necessary land on which to conserve or create forests" (Firth, 1874, 189). Thus he urged the Government to go further; successful forest management in his opinion required five undertakings:

1. the end of reckless waste of forest resources
2. no forest land was to be sold for cultivation
3. cleared forest land was to be acquired and allowed to regenerate naturally or failing this be replanted with indigenous species or conifers

4. virgin forest land was to be acquired and closed leaving sawmillers to meet demand from previously secured stocks

5. plantations of Eucalypts and conifers were to be sown as soon as possible.

These suggestions were put forward to ensure the integrity of forests as a permanent and remunerative landuse. Unfortunately the proposals were not in the immediate best interests of the spread of settlement and the sawmill industry, which was threatened with having to pay increased prices for alienated forest land.

Opposition was the typical response to the Forests Act and Campbell Walker's report. This dissatisfaction stemmed from a number of sources, including a misunderstanding of the purposes of State Forestry, a perceived threat to settlement and private property rights, and even denial that forest management was required. Provincialists in parliament identified the Forests Act and Campbell Walker with the success of the centralists. An Act abolishing the provinces was passed in 1875 (effective from the 1876 elections). Thus forest management attracted attention for other than inherent attributes.

Campbell Walker in his address to the Otago Philosophical Society in 1876 attempted to dispell some of the opposition by an explanation of the principles of State Forestry. In the popular conception forestry was equated almost entirely with tree planting. This narrow view of forestry and a confusion of Inches and Arthur Campbell Walker led the Otago Daily Times to make the "tongue in cheek" observation that,

> "If the gallant Captain can show us how to do this (play whist), and at the same time can instruct us in the art of planting trees he no doubt will be a useful member of the community"
> (Otago Daily Times, 1 August 1876

The item was repeated in other newspapers throughout the colony and led to a rebutal by Campbell Walker to the effect that identities had been mistaken. The major thrust of the newspaper item was however,

a political attack on Vogel over the means of appointment of Campbell Walker. The careful exchange of letters behind the scenes that accompanied the appointment was not revealed.

Political criticism of Campbell Walker and the Forests Act was however, not confined to newspapers. In 1876 a bill to repeal the Forests Act was introduced while Campbell Walker was in the midst of his tour of inspection. Vogel's political popularity had waned and in August 1876 he departed for Britain to take up the post of Agent General. Harry Atkinson became premier and immediately instituted a new financial policy (Bassett, 1975). Extensive borrowing and expenditure, so characteristic of Vogel's ministries, was replaced by financial stringency. The New Zealand Forests Act Repeal bill, 1876 was introduced by John McFarlane an independent member of the house (Fletcher, 1982, 71) a month after Vogel's departure. The 1874 Forests Act made £10 000 per annum available for forest management. Premier Atkinson considered rescinding the legislation an extreme measure and believed that repeal of the financial provisions of the 1874 Act would be sufficient. Instead he favoured special funding to be made available as required:

> "The House could annually make provision upon the ordinary estimates of the Colony for carrying on the [Forests] department whenever it was necessary to do so"
> (NZPD, 1876, 22, 582)

During the debate other members fell back upon old arguments suggesting that forestry administration was better left to local authorities or private enterprise rather than being a responsibility of the State. These attitudes point to underlying misunderstandings about the nature and purpose of scientific forestry.

The Forests Repeal Bill attracted antagonistic support from quarters still embittered by the abolition of the Provinces effective from 1876.

Some members referred to the 1874 Forests Act as "sham" legislation.[7] Others were more emphatic. Donald Reid of Otago, an early supporter of forest management initiatives in that province and in the House during the late 1860s, now claimed that the 1874 Act was a political ploy in the struggle between centralists and provincialists:

> "He believed that the introduction of that (1874) Act was the first inroad, the first encroachment on the provincial system; and furnished the pretext for bringing forward the resolutions declaring that the provinces of the North Island should be abolished"
> (NZPD, 1876, 22, 582)[8]

Only Charles Bowen in the House and Sir John Hall in the Legislative Council drew attention to the protection forests gave from flood damage and drought. The Forests Repeal Bill was passed in the lower house, but rejected by the legislative Council. The Honorable Daniel Pollen suggested that it would be more appropriate to await Campbell Walker's report before acting. In his opinion, "There had been no change in the circumstances which had induced the Council to pass the Forests Act" (NZPD, 1876, 23, 137). However in the longer term State Forestry was not protected, as no money was voted into the State Forests Account. The lack of finances prevented Campbell Walker from being reappointed, despite his earlier hopes to the contrary. The first effort at establishing scientific state forestry in New Zealand was thus forestalled before Campbell Walker had the opportunity to implement the findings of his tour of inspection.

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7. NZPD, 1876, 22 G. Tribe 583, E. Barff 584.

8. Vogel threatened abolition of the North Island provinces during the debate on the New Zealand Forest Bill in 1874.

4.5 CAMPBELL WALKER'S ASSESSMENT OF FOREST RESOURCES: AN APPRAISAL

Campbell Walker brought European and Indian forestry experience to New Zealand. His report on the condition and prospects for the forest resources of the colony was the first assessment by a professional forester. The viewpoint, thus, differed from that of previous and contemporary observers, both lay and scientific. Although aware of Marsh's writings his belief in the "improvement" of forests to ensure a maximum financial benefit, both directly through timber and indirectly through flood protection, indicated a fundamental confidence in man's ability to manipulate nature to his own purposes. In this respect Campbell Walker shared with many contemporaries a view of man shaping nature. He looked upon the indigenous forest as an untidy garden, which required weeding so that it might produce to the full for man's benefit. The purpose of the tour was to familiarise Campbell Walker with the special character of New Zealand forests, but the confidence with which he asserted that European and Indian techniques were applicable to New Zealand stemmed as much from an unshakeable faith in forestry as the results of the inspection. This security of mind allowed him to brush aside the opinions of settlers about the difficulty of achieving regeneration of indigenous species:

> "from what I have seen, I think I am justified in pronouncing the popular opinion to be, as is often the case a popular error, resulting from insufficient knowledge of the science of arborculture and consideration of cause and effect"
> (Campbell Walker, 1876a,192)

A fundamental divergence between Campbell Walker and contemporaries emerged over the merits of indigenous management versus exotic plantations. Campbell Walker, for reasons already examined, saw indigenous forest management as providing the answer to timber supply problems whereas others favoured exotic plantations because of their rapid growth rates and a perceived weakness of the indigenous forest.

In his various writings Campbell Walker addressed most of the problems associated with timber licensing and critically reviewed many of the favoured popular and official solutions. He provided a rebuttal of arguments that private enterprise and land alienation provided the best means of attaining efficient and sustained forest utilisation and protection. His dual task was, firstly, to persuade people that forest management was required and, secondly, to convince them that State Forestry was the most appropriate mode of achieving this goal. State Forestry as advocated by Campbell Walker departed from prevalent laissez faire attitudes to resource utilisation. He justified State "interference" only because it served the public good through securing future timber supplies and protecting "climatic" values in a way in which private enterprise would not. Although State involvement in New Zealand had numerous critics, Campbell Walker's proposals were not the first of that kind. Vogel himself, although in agreement with laissez faire theories, was prepared to use State capital in the absence of private capital to stimulate the growth of the economy. This he attempted through extensive public works and immigration schemes (Oliver, 1960, 117-126). The New Zealand Forests Act, 1874 as originally conceived by Vogel dovetailed neatly into these wider schemes.

Unfortunately State Forestry, although avowedly for the public good, ran into conflict with other powerful social goals. Increasing the efficiency of forest utilisation and promoting sustained yield forestry clashed headlong with the settlement ethos. Campbell Walker saw forestry as a permanent landuse and not a transitional form. This was in marked contrast to the rationale behind timber licensing. A further problem was that Campbell Walker did not distinguish between scrublands and forest lands, thus to many settlers his proposals seemed akin to locking up the land.

Potts, Travers, and later Vogel recognised a distinction between production and protection forests, the latter being referred to as "climatic forest conservancy" by Campbell Walker. On the basis of his inspection Campbell Walker was less perturbed about the extent of environmental modification by flooding, possible climatic modification and the extent of wanton destruction than were contemporary observers. Presumably his view was based at least partly on the levels of modification that he adjudged to have occurred in India and Europe. He was, however, insistent that extensive damage would occur if no action was taken. This he believed required a new Forests Act to secure, demarcate and manage forest lands. These suggestions were not well received, yet they were much milder than the level of State intervention undertaken in France at this time (Woosley, 1920). The extensive area of forest still on Crown Land in New Zealand provided an opportunity to impose large scale State Forestry. The proposal conflicted with a range of goals; settlement, political divisions, laissez faire theories, and favouring of plantations for future supplies. An opportunity was lost when retrenchment removed the financial basis of the Forests Act and ended the first attempt at professional forest management in New Zealand.

CHAPTER V

THE RISE AND FALL OF STATE FORESTRY DURING THE 1880S

5.1 INTRODUCTION

The interactions of individuals and wider social and economic circumstances are important to the understanding of the introduction of a second Forests Bill in 1885 and the demise of State Forestry in 1889. At the time of Campbell Walker's departure in 1877, the future of State Forestry in New Zealand appeared bleak. However, a forests section allowing for reserves for the growth and preservation of timber was incorporated into the Land Act, 1877. A retired French forester, A. Lecoy, who was resident in Wellington, publicized scientific state forestry in the early 1880s. In 1885, Julius Vogel, who had resigned from the Agent Generalship in London and returned to the Colony and its political life during the previous year , introduced a second Forests Bill. In turn, Thomas Kirk was appointed as Chief Conservator of Forests. A second phase of State forestry in New Zealand was initiated, only to be abruptly truncated by Government retrenchment in 1889. Harry Atkinson was again Premier during the demise of State forestry.

Contrasting official, popular and foresters' appraisals existed in the 1880s. The lands and forests question was important not only because of the primacy of settlement, but due to the tensions it created within its Crown Lands Department, which was responsible for both land development and forest reserves.

Kirk was a botanist-naturalist and advocate of scientific forestry, but was not a professional forester by training. His appointment was an example of colonial administrators believing that local experience should be utilized to manage the indigenous forests. However, Kirk was also freed from slavishly following conventional forestry thinking,

able to seek advice from a wide range of sources, and produced some skilful compromise solutions.

Personal interests brought Vogel back to the colony in 1884 and he seized the opportunity to return to large overseas loans and resource development to bring the country out of depression. The State Forests Act played a part in this scheme. Equally, the demise of State Forestry may be interpreted as a rejection by the electorate of Vogel's "bold borrowing" policies and a return to Atkinson's "prudent borrowing" and financial retrenchment.

This chapter endeavours to highlight the specific and general circumstances in which State forestry efforts were renewed and subsequently failed in the 1880s.

5.2 LECOY AND THE FORESTS QUESTION IN NEW ZEALAND

Interest in scientific State forestry was sustained in the late 1870s and early 1880s by A. Lecoy, a retired French forester resident in Wellington. In 1879 Lecoy read a paper to the Wellington Philosophical Society entitled The Forest Question in New Zealand. At the request of John Ballance, then Minister of Lands, he submitted two further reports for parliamentary consideration (AJHR, 1880, H3, 1881, H11). Lecoy provides another example of a professional forester's appraisal of forest resources. He played an advocate's role and sought to demonstrate the economic value of state forestry and consequent need for a forests department.

Lecoy advocated State forestry as a means of regulating timber supplies in the long term, providing a source of state revenue, and for protection from floods, droughts and climatic disequilibrium. He acknowledged the importance of protection forestry but focussed attention on the role that the State could play in ensuring long term timber

supplies in situations where private enterprise would opt for a speedier return off other landuses.

Vogel's public works programme existed "for the purpose of turning to profits the natural resources of the public estate" (Lecoy, 1879, 3) and Lecoy was intent on showing that unfamiliar and misunderstood State forestry also offered prosperity. The "systematic treatment of the Crown forest lands" would, be extravagantly claimed, "provide at any time the largest proportion of the expenditure required for general State purposes" (Lecoy, 1879, 3). He tempered these possibilities with the warning that, despite views to the contrary, supplies of timber did not exist in "super abundance" - "such an opinion [was] not at all supported by any reliable data or technical development" (Lecoy, 1879, 6). Like Campbell Walker, Lecoy realized that land alienation procedures were speedily reducing the forest estate. Rather than making direct criticisms about land alienation, which have lost him support, Lecoy was content to suggest that open and forested lands should be separately managed by agronomists and foresters.

Lecoy also found fault with the timber industry. He considered the indigenous timbers to have superior qualities and export potential. Yet, at the time, there was a depression in the timber industry caused, in Lecoy's opinion, by supplies of indigenous timber being available "in excess of the present requirements of the population" (AJHR, 1880, H3, 2). He was critical, as Campbell Walker had been, of the alienation of forest land at nominal prices. But, in blaming depression in the timber industry solely on supply considerations, to which his solution was development of an export market, he adopted a narrow forester's view of the circumstances. He neglected to consider the removal of duty on imported timber in 1878, as part of a free trade

experiment, which resulted in a massive influx of dressed sawn timber from the Pacific United States and depressed the local industry (Table 5.1, Arnold, 1976, 117). Besides, by the late 1870s, the public works boom was over, overseas sources of credit were exhausted, and the effects of depression were being more widely felt throughout the colony (Sinclair, 1974, 161).

Timber licensing had been criticised during the 1870s (see Chapter II) and Lecoy also drew attention to difficulties with this system of forest management. He considered that it provided conditions advantageous to licence holders with no benefits accruing to the State as well as producing other detrimental effects in the form of indiscriminate cutting and hampering of natural regeneration.

The existing situation, in his opinion, left no doubt "as to the necessity of introducing sweeping reforms in the present management of these forests" (AJHR, 1880, H3, 5). He proposed a permanent staff, initially of outrageous proportions, numbering 575 which he later reduced to 130-140 (AJHR, 1880, H3). Their duties would include:

1. the regulated sale of standing timber as a permanent contribution to state income
2. to brand standing timber for sale, calculate their volumes and select areas for natural regeneration
3. to stop the indiscriminate working of forest areas without thought of natural regeneration
4. to estimate the value of forest lands for auction.

The forests were to be worked in perpetuity on a rotational basis. Lecoy provided two estimates of the forest area that would be required for this purpose and the possible financial returns (Table 5.2). He considered 5 000 000 acres, about half of the remaining Crown forest in 1879, was accessible and valuable for forestry. But his estimate of demand were excessive and the rotation periods that he envisaged were based on European standards. Little was known about indigenous

Table 5.1

DRESSED AND SAWN TIMBER IMPORTS INTO NEW ZEALAND

1877-1882

Year	Total Dressed and Sawn (Superficial feet)	Value £	Atlantic USA Sp ft	£	Pacific USA Sp ft	£
1877	747 518	7 959	46 766	617	300	8
1878	818 437	8 119	44 220	489	333	5
1879	3 533 480	29 531	404 926	3 156	799 483	5 552
1880	617 488	2 899	459 837	1 592	-	-
1881	154 815	1 067	88 852	786	-	-
1882	281 668	1 852	216 754	1 398	-	-

Source: New Zealand Statistics, 1877-1882.

forest growth rates at this time.

Lecoy's suggestions for the improved regulation of the timber industry were ultimately more valuable and foreshadowed in part some of the charges instigated by Thomas Kirk, the Chief Conservator of Forests 1886-1889. A fundamentally different approach to the problem of reducing waste was suggested by Lecoy:

> "disposing of the standing timber for its contents expressed in cubic or superficial feet, instead of leasing areas of forest, and then relying upon the declaration of the leasees as to the quantities cut down by them."
> (AJHR, 1881, H11, 3)

Timber licences, which gave cutting rights over defined areas of land because of their cheapness and royalties paid on the output of sawn timber, had proven ineffective in combatting inefficiency. Although, the difficulties of policing and enforcement of the regulations was another important reason for the continued wasteful use. Sale on the basis of an assessment of the standing timber volumes held the promise of combatting inefficient utilisation as the timber had already been paid for prior to felling.

Lecoy's 1879 paper was an advocate's view, perhaps deliberately accentuating the benefits obtainable from State forestry. His audience included Thomas Kirk, who had assisted Campbell Walker on his 1876-1877 tour, Charles O'Neill, who championed forest conservation in the early 1870s, and George Waterhouse, formerly Chairman of the Joint Committee on Colonial Industries (AJHR, 1870, F1) which had made recommendations encouraging tree planting. All were agreed as to the need for forest management. However, Waterhouse reflected the general opinion that Lecoy was "too sanguine as to the success of such an undertaking in New Zealand at present" (TNZI, 1879, 13, 423). After Campbell Walker departed, the only conspicuous efforts at championing State forestry were made by Lecoy. But his efforts did not yield immediate rewards

Table 5.2

PROPOSALS FOR SYSTEMATIC FORESTRY IN NEW ZEALAND

Year	Total Area of Valuable Crown Forest Land (acres)	Demand (superficial feet)	Average Yield per acre (superficial feet)	Total Annual area to supply demand (acres)	Total Area required (acres)	Income to the State from Sales and Export duty (£)
1879	5 000 000	500 000 000	21 000	23 810	at 100 years 2 381 000	1 500 000
1880	5 000 000	300 000 000	15 000	40 000	at 125 years 5 000 000	1 000 000

Source: Lecoy, 1879, 1880.

and it was not until the mid 1880s that further steps were taken towards instituting scientific forestry in New Zealand.

5.3 OFFICIAL AND POPULAR FOREST APPRAISALS: THE CROWN LANDS DEPARTMENT AND PARLIAMENT

Scientific State forestry as advanced by Lecoy, and Campbell Walker before him, was misunderstood and not part of popular and official responses to forest management during the early 1880s. Instead, forest management was discussed in terms of, reserves for the regulated exploitation of timber, soil and water protection, and tree planting. Various aspects of the popular and official appraisal of forest resources provide insights into attitudes towards the physical environment and conflicts of interest within the Crown Lands Department with regard to forests.

The Crown Lands Department was, in the absence of a forests department, responsible for forests on Crown Lands. The abolition of the Provinces in 1876 necessitated a new land act in 1877 to standardise and administer the Crown Lands of the Colony. Provisions for the reservation and administration of forests were also contained in this legislation. Wynn (1977) perhaps creates the impression that all momentum in State forestry was lost on Campbell Walker's departure. This is truer with respect to scientific rotational production forestry, but other initiatives continued. In the late 1870s and early 1880s over 200 reserves for the Growth and Preservation of Timber in excess of 500 000 acres were gazetted (Figure 5.1, 5.2). Progress was hampered by the competing demands of settlement which took precedence over forest reservation. In spite of this, the period exists as a bridge between the Vogel-Campbell Walker era and the revival of State forestry in the mid 1880s under Vogel and Thomas Kirk.

The term "Growth and Preservation of Timber" enabled reserves

Figure 5.1

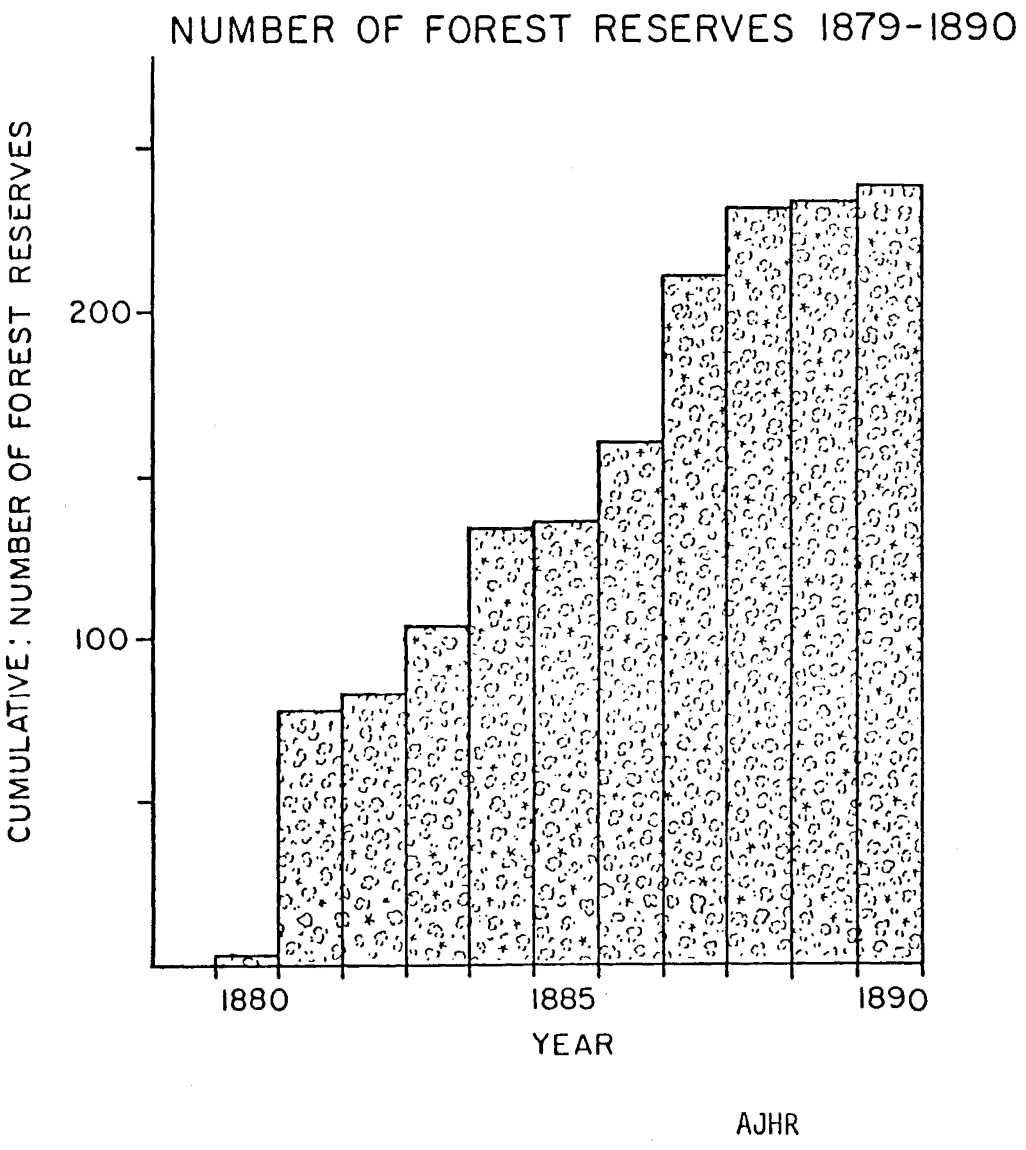
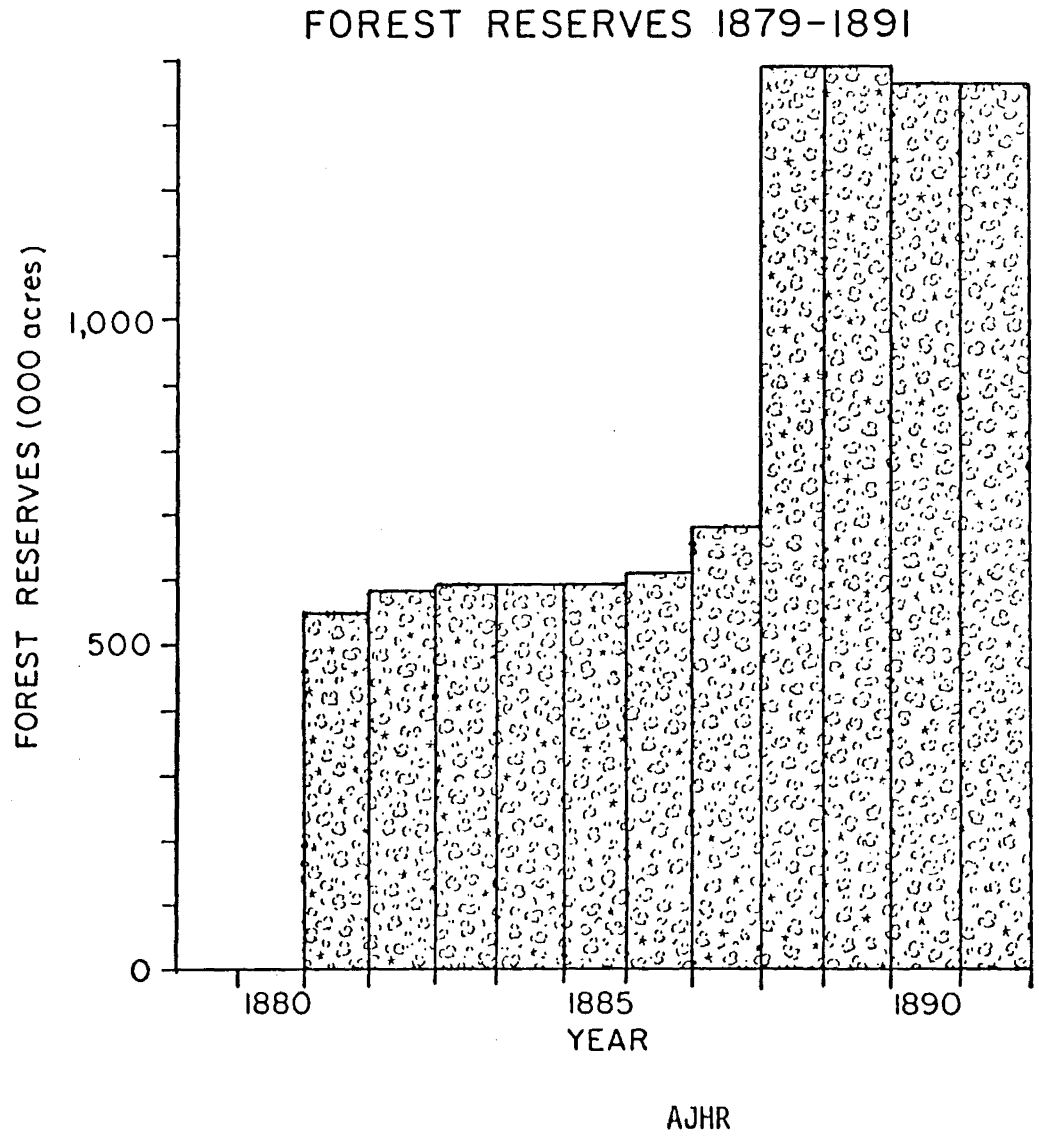

NUMBER OF FOREST RESERVES 1879-1890
CUMULATIVE: NUMBER OF FOREST RESERVES
200
100
1880
1885
1890
YEAR
AJHR

Figure 5.2


FOREST RESERVES 1879-1891
FOREST RESERVES (000 acres)
1,000
500
0
1880
1885
1890
YEAR
AJHR

to be gazetted for both soil and water protection purposes and for the regulated exploitation of timber. The role of forests in providing soil and water protection won early acceptance in the Crown Lands Department. Protection forestry was obviously beneficial to the farming enterprises. In 1881, James McKerrow, the Under Secretary for Lands was directed by William Rolleston, the Minister responsible, to inform the Commissioners of Crown Lands that:

> "in the survey and disposal of Crown Lands care is to be taken to reserve from sale the forest on hill tops and at the sources of rivers and streams. The object of this instruction is to guard against the drying up of streams in the summer season."
>
> (Surveyor Generals Correspondence 1881, No 82)

This position was reiterated in the Crown Lands Department reports from 1882 to 1886. However, a major contributing factor to the successful designation of many forest reserves was, doubtless, their location. High mountains and hill-top forest lands were typically unsuited to agricultural purposes. In these situations there was no conflict between settlement goals and those of protection forestry.

The question of timber famine also received some passing attention. In 1879 the Commissioners of Crown Lands were asked to provide estimates of the remaining acreage of crown forest. The final tally was just over 10 000 000 acres (Table 5.3) and is probably sufficiently accurate to provide a simple statement of regional variations in forest cover. Yet reservations about the extent of remaining timber supplies were voiced in the Crown Lands report of 1880:

> "The vast extent of this area would seem to preclude at first sight any real anxiety as to the supply of timber falling short in the colony, but on further examination, it appears that we are exhausting the stock of some of the young trees, and in a wasteful manner, which in the future interests of the colony is much to be regretted"
>
> (AJHR, 1880, C2, 4)

The official response was to create timber reserves. The viewpoints

Table 5.3

ESTIMATED ACREAGE OF FORESTS ON CROWN LANDS IN 1879

Land District	Forest Area (acres)	Percent of Land District
Auckland	1 330 600	10
Hawkes Bay	177 270	3
Taranaki	695 000	29
Wellington	1 000 000	15
Nelson	2 725 000	58
Marlborough	220 000	8
Canterbury	190 000	2
Westland	1 900 000	49
Otago	1 421 000	16
Southland	500 000	7
Total	10 158 870	15

Compiled from AJHR, 1879, C5.

of Campbell Walker and Lecoy had not been assimilated. Official thinking had not advanced since the 1860s when forest reserves to regulate the rate of exploitation had first been made. Tree planting was the only alternative considered and this was assisted through encouragement schemes, such as under the Forest Trees Plantings Encouragement Act, 1871, rather than direct official involvement.

Other inhibiting forces were at work. Campbell Walker and Lecoy both identified a clash of interests between land settlement and State forestry over land alienation. Even though scientific forestry aimed at natural regeneration and rotational cutting was never intended as a function of the Crown Lands Department, there were still conflicts of interest which made it difficult for one agency to administer both lands and forests. Given the supremacy of settlement goals, clashes were generally decided in favour of agricultural land uses; forest management from the onset was given a low priority.

The question of the "wanton destruction" of forests was one question that tested the Crown Lands Department's administration of forests. Astute observers such as Hochstetter and Potts had referred repeatedly to the widespread waste of forest resources. However, McKerrow persistently denied that "wanton destruction" was occurring in Crown forests. With reference to the reports that accompanied the Commissioners of Crown Lands' estimates of Crown forest area in 1879, he claimed that, "while unlicensed cutting may take place to some extent in remote bushes there is really no wanton destruction" (AJHR, 1879, C5, 3). Although the Crown Lands report of 1880 referred to the "wasteful manner" in which forest land was being cleared, McKerrow persisted. In 1881 he claimed tight regulations had not been made "in the absence of any wanton destruction in the forests" (AJHR, 1881, C5, 4). Yet, in the same report, McKerrow, in apparent contradiction,

stated that, "it is a matter of regret to see the beautiful rimu and other valuable timber fallen and burned off like so much rubbish" (AJHR, 1881, C5, 4).

Part of the ambiguity in McKerrow's statements stem from the range of Crown Lands Department duties. They were responsible for opening lands for settlement, yet they were also supposed to identify and reserve forest land. Settlement goals had priority and reflected wider ideas related to the "improvement" of wastelands, as they were termed, by converting them to agricultural usage. These concerns are reflected in McKerrow's comments on the progress of settlement in the Opunake area:

> "the face of the country is being rapidly transformed from an unbroken wilderness of sombre fern and forest to the green landscape enlightened by numerous homesteads herds of cattle and numerous cultivated fields"
> (AJHR, 1881, C5, 2)

What some observers, such as Potts, saw as "wanton destruction", others, exemplified by McKerrow, regarded as a facet of land clearance and settlement: progress. The land itself rather than the forests growing upon it was the focal point.

However, although secondary to settlement goals, there was an accepted place and role for forest reserves. These were not for purposes of scientific forestry but for protection purposes and regulation of exploitation.

The widespread popular appraisal of forests into the 1880s remained fairly much unchanged from that of the 1870s. Forests were generally regarded as virtually inexhaustible and an obstacle to settlement. Only a few individuals displayed a sharper perspective. Some of these observers were Parliamentarians and their observations were recorded in the New Zealand Parliament Debates.

Probably the most persistent advocate of forest management in the

early 1880s was Henry Chamberlin. On several occasions he requested returns indicating the extent of forest lands that had been reserved under the Land Act, 1877 (AJLC, 1882, No 6, 1883, No 1, 1884, No 1). Chamberlin was concerned that insufficient forest land had been reserved. He also drew attention to the question of forest influence on rainfall and the links between deforestation and flooding.

Other members spoke of an impending timber famine. For example, in 1882 Richard Cadman drew William Rolleston, the Minister of Lands', attention to a probable consequence of rapid growth in the timber industry:

> "he had no hesitation in saying that within twenty four years - instead of the forty as predicted by Mr Kirk - the forests of New Zealand would be pretty well cleared off."
>
> (NZPD, 1882, 42, 644)

Rolleston attempted to alleviate Cadman's concern by drawing his attention to forest reserves already proclaimed under the Land Act, 1877 and to tree planting to offset future shortages.

The popular concerns of the 1880s towards protection from flooding and climatic modification, a timber famine and exotic afforestation to provide future requirements were much the same as in the 1870s. However some ideas were in flux. This is well illustrated by changing attitudes towards the question of a forest's influence on rainfall. Henry Chamberlin, when drawing the attention of the Legislative Council to forests, repeatedly mentioned the influence of forests on rainfall. This he attempted to show in an empirical fashion by reference to rainfall statistics dating back to 1866. Although Campbell Walker had earlier decided the New Zealand data showed no clear patterns, Chamberlin claimed that deforestation in Auckland, Southland and Canterbury had reduced the rainfall. Conversely he argued that the forested Wellington and Taranaki regions had retained higher levels of precipi-

tation "this all went to show", he claimed,

> "the desirability of retaining our forests and he could not help thinking that the Government were to blame in not taking a little more trouble in the matter"
> (NZPD, 1882, 45, 212)

Chamberlin took no account of cyclic variations in rainfall or differences due to variations in aspect, altitude and latitude. This is understandable as a scientific understanding of weather systems was only crudely developed at this time. Beyond this he may have been guilty of self-deception for the choice of class intervals that he imposed on the data maximised a pattern of declining rainfalls in deforested regions (NZPD, 1882, 45, 211; AJHR, 1890,H42). Different class intervals or starting points produces no definite trend. It is, however, interesting that Chamberlin attempted to illustrate his argument in empirical fashion where previously speculative theorising would have sufficed.

At this time the scientific community was beginning to retreat from supporting forests as having a marked impact on rainfall levels (Powell, 1888, Lull, 1949). It was some time before these new outlooks became assimilated into the popular appraisal which thus lagged behind the scientific perspective. There is, however, evidence of changing ideas about forests and rainfall. Some members of the Legislative Council agreed with Chamberlin's interpretation of the forests influence question (Table 5.4). However, it is important to note that more spoke against deforestation decreasing rainfall than supported the idea. This indicates some loss of support for the simple rainfall-forests linkage, although no single alternative hypothesis was widely favoured. Instead more emphasis seemed to be given to deforestation as a cause of flooding and inundation, thus shifting the emphasis somewhat. This still provided a rationale for protecting forests.

The official and popular appraisal of forests in the early 1880s

Table 5.4

OPINIONS EXPRESSED BY LEGISLATIVE COUNCILLORS ON FOREST INFLUENCES

Member	Supporter of Forest Influences	Type of Forest Influence attributed
Chamberlin	Yes	Rainfall decreases with deforestation. Area of forest land a climatic indicator
Barnicott	Yes	Forests influence moisture levels, and as windbreak and check floods. The reverse is equally true
Johnston	Yes	Deforestation leads to flooding and inundation
Scotland	No	Rainfall totals in New Zealand show no perceivable change with deforestation
Whitaker	Yes	Rainfall has increased with deforestation
Williamson	No	Doubts that a relationship between forests and rainfall exists
Richmond	No	Cause and effect are being confused: forests follow rain not vice versa
Nurse	No	Draining land has reduced rainfall not deforestation

Compiled from NZPD, 1883, 45: 211-219, 244.

suggests that there was an accepted but limited place for forest reserves. The rationale was generally limited to use and water protection or reserving future supplies of timber. In application reserves were also limited in extent and location, typically to areas of no use for settlement.

5.4 THOMAS KIRK'S REPORT ON NATIVE FORESTS AND THE TIMBER INDUSTRY

Soon after Julius Vogel returned to New Zealand in 1884 and re-entered political life, he adjudged that New Zealand's forest legislation should be revised (see section 5.5). This led to Professor Thomas Kirk being engaged late in 1884 to examine the forests and timber industry of the colony. Kirk had assisted Campbell Walker on the 1876-1877 inspection of the New Zealand forests. A skilled botanist and naturalist he was an obvious choice for the task and, although not trained as a forester, had displayed a consistent interest in the subject (eg. Kirk, 1878, 1880). Certainly it was more convenient and less expensive to have Kirk undertake the report rather than bring in an overseas specialist. Besides, even at this early stage in the colony's development, it was a prevalent opinion that local residents could best evaluate the special qualities of the New Zealand environment. Kirk himself had ventured such an opinion to Vogel over the question of obtaining the services of an overseas forester after the passage of the New Zealand Forests Act, 1874 (Brown, 1968, 5).

Kirk produced his report on Native Forests and the State of the Timber Trade in 1886 (AJHR, 1886, C3, C3A). It was accompanied by subsidiary remarks as the utilization of timber and secondary forest products (AJHR, 1886, C3B). These reports were oriented towards providing a description of the forest estate and the condition of the timber industry. Four major concerns emerged:

1. a description of the extent and quality of the forest estate
2. a summary of the state of the sawmill industry
3. criticisms of regulation within the sawmill industry
4. a discussion of the timber supplies question

The reports emphasised the economic potential of a wide range of forest products, a theme that Kirk had addressed earlier (Kirk, 1878). Resource development, rather than forest reserves for soil and water preservation, was to receive greater attention from administrators.

The reports indicate the location, extent and amount of convertible forests on Crown Lands within each of the ten Land Districts[1] of the Colony. Nearly fourteen million acres of forest remained in Crown Lands (Table 5.5). Considerable areas were not regarded as suitable for milling and other portions were intended for settlement. The approximate nature of early calculations of forest area is revealed through comparing Kirk's acreages with the official 1879 estimates (Table 5.3). Kirk's total is nearly four million acres larger even though it was undertaken half a decade later. Arguably his inspection was more thorough and accurate. This does, however, illustrate the variations that occur in New Zealand's early forestry statistics.

Considerable attention was focussed on the state of the timber industry. This included the number of saw mills and how many were employed in them as well as the output of sawn timber and its value (Table 5.6). In summary, over 200 sawmills employed over 4000 men and produced in excess of 230 million superficial feet of sawn timber

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1. After the abolition of the Provinces, land legislation was standardized in the Land Act, 1877 and administered by Commissioners of Crown Lands in new units known as Land Districts. These approximated the old provincial boundaries.

Table 5.5

KIRK'S ESTIMATE OF THE FOREST AREA ON CROWN LANDS IN 1886

Land District	Forestlands (acres)	Forest as a Percent of Land district
Auckland	1 606 350[1.]	9.4
Hawkes Bay	225 870[2.]	8.2
Taranaki	729 000[3.]	31.8
Wellington	1 351 630[4.]	19.3
Nelson	3 290 000	47.0
Marlborough	512 000	2.0
Canterbury	374 350[5.]	4.3
Westland	2 521 107[5.]	73.9
Otago	3 000 000	21.8
Southland	345 197	15.1
Total	13 955 554	

Compiled from AJHR, 1886, C3, C3A.

Notes:

1. Total forest area estimated at 7.2 million acres

2. Does not include 254 058 acres of Maori land

3. Does not include 1 034 000 acres of Maori land

4. Does not include 1 700 000 acres of Maori land but does include 435 000 acres intended for settlement

5. Includes 632 519 acres of lowland scrub and inferior wood.

Table 5.6

STATISTICAL SUMMARY OF THE TIMBER INDUSTRY OF NEW ZEALAND IN 1886

Land District	Number of Sawmills	Men Employed	Output in Superficial feet (Sp ft)	Value of output per 100 Sp ft	Total Value £
Auckland	43	1 875[3]	112 000 000	10/-	560 000
Hawkes Bay	18	265	15 000 000	8/6 to 10/6	63 750 to 78 750
Taranaki	7	106	5 750 000	10/-	28 750
Wellington	35	550	35 000 000[4]	10/-	175 000
Nelson	22	139	5 260 000	-	(26 300)
Marlborough	14	175	8 606 340	-	(43 021/10)
Canterbury	21	263	9 893 000	10/6 to 12/6	519 38/5/- to 618 31/5
Westland	13[1]	?	12 000 000[5]	9/6	57 000
Otago	13[2]	101	7 600 000	12/- to 14/-	456 000 to 532 000
Southland	36	700	21 000 000	6/-	63 000
Total[6]	222	4 174	232 109 340		1 139 089[7]

Notes:

1. Only a third operators on a full time basis
2. Only 11 were in operation
3. Kirk considered this an under estimate
4. Kirk considered this an under estimate
5. Kirk considered the employment figure too low and output inflated
6. Kirk's statistics, with exception of the Westland value, fairly closely match the 1886 Census return of sawn timber
7. Calculated on basis of 10/- as average prices for Marlborough and Nelson.

valued, on the average prices quoted by Kirk, at over £1 million.

Kirk also paid close attention to the efficiency of milling operations. He was impressed with the Southland saw mills but critical of the conversion rates from logs to sawn timber obtained in the Hawkes Bay and Wellington region:

> "The properties of waste in the conversion of totara is greater than any other New Zealand timber of large dimensions: it is so rarely under 40 to 45 percent and in some cases exceeds 50 percent"
> (AJHR, 1886, C3A pt II 3)

However Kirk may have been extreme in his expectations. Troup (1940, 205) suggested that up to 60 percent of a log could be discarded as waste, although this figure was reduced where extensive utilisation occurred and cut offs were put to use.

Regionally the timber industry was of considerable importance in Auckland and Southland. Auckland clearly dominated all facets of the industry when the timber trade played an important role in the business community (Stone, 1973). Kirk was adamant, however, that the strictest conservation of Kauri was required because of the integral importance of timber to the regional economy:

> "the progress and welfare of the northern districts have been largely due to her magnificent forest resources, and their conservation will prove an important factor in the permanence of her prosperity"
> (AJHR, 1886, C3A, 25)

This statement, made before utilization of refrigeration to export mutton to Britain, indicates that Kirk envisaged an enduring forest industry as the economic base of some regions of the colony. Auckland and Southland, he believed, offered the best possibilities because of the availability of extensive supplies of high quality timbers securable at low royalties, the ample forest reserves, low rail transport costs and access to ports.

In Kirk's opinion, "inefficient conversion" was not solely the

fault of the mill operators but resulted from the nature of the sawmill regulations. Much waste occurred in the felling and transportation of logs to mill sites. This situation was accentuated by the persistence in some districts of a timber licensing system. In other regions royalty payments were in vogue (Table 5.7). There were considerable regional variations, but generally rights to cut on Crown lands were obtained at less expense than on freehold lands.

A major weakness of the royalty system, on both Crown and freehold lands, was that it was calculated on the basis of sawn timber and not on the standing crop. Although it was relatively easy to accurately assess the quantity of sawn timber, this was left to the mill owner to undertake and was subject to abuse. More importantly, a royalty on the sawn output created no incentive to efficiently fell and convert timber. This was a consideration that had not escaped Lecoy in 1880. Kirk echoed his remarks:

> "The royalty is charged on converted timber only, so that the sawmiller is at no loss on account of faulty logs or waste, and is not called upon to pay royalty on any standing timber that may be destroyed by fires on sections held under the regulations"
> (AJHR, 1886, C3, 4)

Thus Kirk drew attention to a major weakness in existing systems for regulating the exploitation of forests.

Timber supplies were the other important issue. Earlier Kirk had suggested to Campbell Walker that the indigenous timbers would be exhausted in 40 years (see Chapter III). He later reduced this estimate to 30 years (Kirk, 1878). On the basis of his 1885 tour of inspection he calculated that supplies of Kauri, at 1886 levels of use, would be exhausted in 26 years (ie. by 1912). If existing trends in rates of use continued the period would be reduced to fifteen years (ie. by 1901). He did not provide similar estimates for other species or regions.

Table 5.7

TIMBER LICENCE AND ROYALTY PRICES IN 1886

Land District	On Crown Lands	Typical freehold
Auckland	?	3d to 9d per 100 Sp ft for Kauri[1].
Hawkes Bay	?	3d to 9d per 100 Sp ft for Red and White Pine. 1/- to 2/- per 100 Sp ft for Totara[2].
Taranaki	?	
Wellington	?	3d to 4d per 100 Sp ft for Red and White Pine. 9d to 1/- per 100 Sp ft for Totara
Nelson	Timber Licences 4/- per acre/p.a.	?
Marlborough	6d per 100 Sp ft measured on the log	6d to 1/- per 100 Sp ft
Canterbury	Land purchase at £2 per acre	?
Westland	Timber Licence £5 per annum	?
Otago	Saw mill licences £1/1 an acre for 100 or 200 acre blocks	?
Southland	3d per 100 Sp ft on Converted timber (in 200 acre blocks)	?

Compiled from AJHR, 1886, C3, C3A.

Notes:

1. Much of the Kauri was on freehold land

2. Most of the best totara was found on Maori lands.

Although Kirk did not detail how he calculated his value of 26 years, it is possible to arrive at the same answer using information that he provided on forest area, average yields and levels of timber consumption.[2] This was one of the first attempts at calculating the duration of remaining timber supplies. Previous estimates tended to be based on subjective observation.

Using other data provided by Kirk it is possible to calculate the duration of timber supplies for the colony (Table 5.8). These estimates range from hundreds to thousands of years. Only in Auckland where the sawmill industry was extensive and long established did a timber famine appear imminent. It would not have aided any case for revision of sawmill regulations to suggest that many hundreds of years supplies remained. Besides, Kirk was aware that large areas of forest in some districts contained little that could be economically converted. Similarly, it was not economically feasible to utilise some forest areas, and if timber consumption continued to rise calculations based on the 1880 output would over-estimate the duration of supplies. Hence Kirk presented an estimate of the duration of timber supplies in Auckland that was in line with some earlier assessments (see Table 3.2). Perhaps he avoided submitting equivalent calculations for other regions because of their unsophisticated nature which would allow them to be interpreted to suggest that timber supplies were not in any way threatened.

Kirk was principally concerned with the efficient operation of the timber industry and fuller utilization of a range of secondary forest products, such as bark. He foresaw the potential for permanent

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2. 200 000 acres of Kauri x 15 000 superficial feet average yield = 300 000 000 superficial feet.
300 000 000 superficial feet ÷ 112 000 000 superficial feet (1886 output) = 26 years supplies.

Table 5.8

ESTIMATES OF THE DURATION OF TIMBER SUPPLIES BASED ON KIRK'S 1886 DATA

Land District	Viable Supplies (ac)	$\bar{x}$ yield ac (Sp ft)	Output 1886 (Sp ft)	Duration of Supplies at 1886 output (years)
Auckland	200 000[1.]	15 000[3.]	112 000 000	26
Hawkes Bay	66 000[2.]	40-50 000	15 000 000	176- 220
Taranaki	1 763 000	6-10 000	5 750 000	1 839-3 066[5.]
Wellington	706 000	-	35 000 000	907
Nelson	1 000 000	40 000[4.]	5 260 000	7 604
Marlborough	"Little"	30 000	8 606 340	?
Canterbury	"extremely small"	14-17 000	9 893 000	?
Westland	632 519	40 000	12 000 000	2 108[6.]
Otago	1 250 000	-	7 600 000	3 371
Southland	2 000 000	20-21 000	21 000 000	1 904-2 000

Notes:

1. Kauri only
2. Much inferior
3. Described as a low average value
4. Described by Kirk as similar to Westland yields
5. Calculated using 45 000 Sp ft/acre value from Hawkes Bay
6. Calculated using 20 500 Sp ft/acre value from Southland.

forest industries in Auckland and Southland. Hence he was concerned with some aspects of land settlement which accentuated wasteful deforestation. Specifically he commented on the deferred payment system of land purchase which required the occupiers to take steps to "improve" the land (Lloyd Pritchard, 1970, 134-136). It was required that occupiers should clear one twentieth of the total area of the holding each year until one fifth was cleared, which prompted Kirk to observe that,

> "The strict enforcement of this condition has necessarily led to the destruction of a large quantity of convertible timber and in some instances has carried considerable loss and inconvenience to the sawmiller"
> (AJHR, 1886, C2 pt II, 7)

In a non-provocative way Kirk was endeavouring to remove some of the barriers to the efficient utilisation of forest resources.

There is, however, an interesting aside in Kirk's report which foreshadows events in the late 1880s and 1890s (see Chapter VI). Timber cutting around Lake Wakatipu incurred his displeasure:

> "The wanton destruction is not simply a blot on the district, it is a slur on the colony at large, and should be arrested without further delay. The lakes belong to the colony and their natural attractions should be carefully preserved for the benefit of the colony"
> (AJHR, 1886, C3, 9)

Kirk had suggested that scenic motives should prevail over timber cutting. The comment perhaps stemmed from Kirk's close experience of the New Zealand environment as a field naturalist. This issue, however, was not a major thrust of his reports.

The report on the native forests and the timber trade preceded the passage of a State Forests Act in 1885 and contributed to Kirk's appointment as Chief Conservator of Forests in the Colony.

5.5 THE STATE FORESTS ACT OF 1885

In 1884 Vogel resigned as Agent General in London and returned to New Zealand. Initially he re-entered politics in an effort to

save a failing land company in which he had financial interests (Hamer, 1962, Dalzeil, 1981, 106). Ever the opportunist he adjudged that the political mood after a period of economic depression was favourable for a return to his "bold borrowing" policies which had produced prosperity in the early 1870s. The outcome of the 1884 election was the formation of the Stout-Vogel Ministry. Vogel was Colonial Treasurer and charted a return to overseas borrowing and natural resource development in an attempt to end the economic depression.

During his time in Britain, Vogel had maintained some passing interest in forestry. He forwarded various papers and reports on forest topics to the New Zealand government (F 10/1). These included publications by Dr J. Crombie Brown on aspects of protection forestry, replanting and forestry education (eg. Brown, 1877, 1877a, 1877b). Almost immediately after returning to New Zealand he showed a renewed interest in State Forestry. In 1884 Kirk was engaged to report on the colony's forests and the state of the timber industry (see section 6.5). This report although not published until 1886 in turn had some bearing on new forestry legislation introduced in 1885.

A new forests act was required because existing legislation could not fulfil Vogel's intentions. The New Zealand Forests Act, 1874 was couched in provincial terms so it was now archaic. Similarly, the forest clauses of the Land Act, 1877 were limited in scope to the reservation of forest for "the Growth and Preservation of Timber". Vogel hoped to successfully reintroduce scientific State forestry into New Zealand. The revenues he hoped the forests would yield were a facet of his resource development strategies.

Vogel introduced the State Forests Bill into the House of Representatives in 1885. The bill was intended to facilitate the creation and "skilled management" of State Forests to:

1. prevent the wasteful use of timber
2. preserve timber for future industrial purposes
3. protect the climate by preserving forest growth in higher lands.

Other provisions of the act included the appointment of a Minister to be known, somewhat confusingly, as the Commissioner of State Forests and of forest conservators as well as annual appropriation of £50 000. The requirements of forest management were outlined. Illegal cutting, wanton destruction, fire, grazing and other misuses were subject to fines. However, timber licences could still be granted and timber floating was permitted with the approval of the local conservator. A school of forestry and agriculture was also intended. The new bill also repealed the earlier forest legislation and in its place offered scientific state forestry and subsidies to local bodies for establishing plantations.

The schedule attached to the bill contained important sections dealing with the implementation of scientific State forestry. The boundaries of all State forests were to be surveyed and marked. Three classes of forest reserves were described:

1. Climate Reserves - no timber was to be cut from these reserves which were designated above specified altitudes for the maintenance of the climate
2. Mountain Reserves - These would lie between Climate Reserves and Level Reserves (see below). They were to be divided into blocks and felled in rotation
3. Level Reserves - These extended up to a defined altitude above which Mountain Reserves were located. The mode of felling and utilization was to be decided by the Conservator of Forests within existing Licence conditions.

This schedule instituted rotational forestry as a distinct form of forest management. Albeit that it existed alongside protection forests (Climate Reserves) and the continuance of early licence and royalty systems (Level Reserves). In this respect Vogel's 1885 bill

was in advance of his 1874 legislation.

Vogel was confident the bill would win support because, he argued, the circumstances that had produced opposition in 1874-1876 no longer existed: the provinces had been abolished. Although insular provincialism was no longer an issue, many of the arguments raised in the debate on the 1874 legislation again surfaced. However, on this occasion the debate was neither long nor vitriolic. Discussion of the bill centred on a cluster of recurrent themes. Ranking them according to frequency of occurrence illustrates the scope of the debate:

1. forests as a source of revenue
2. the Timber Famine
3. Wanton Destruction
4. afforestation
5. forests and Settlement Conflicts
6. forest Influences on Climate
7. problems of preserving forest areas
8. conservation as a "fad".

Arguably, in view of immediate and imminent issues the first five are also the most important themes at this time.

A belief that forests could provide significant amounts of revenue for the State implies a considerable reappraisal. It required temporing the belief that forests were always an obstacle to settlement and accepting that the timber industry could become a renumerative permanent, rather than transitional, landuse. It is interesting to note that although Vogel included climatic protection as a function of the act he did not emphasise this role during the debate. Observation of landscape despoilation, fresh in his mind when Vogel spoke on forests in 1874, had by 1885 faded and played no great part in his arguments.

Ballance, the Minister of Lands accepted that wanton destruction

continued to occur:

> "It is true that in nearly all parts of this Island the destruction of timber is going on with the greatest rapidity"
>
> (NZPD, 1885, 51, 209)

This statement contrasts sharply with the official viewpoint adopted by the Crown Lands Department and repeated in annual reports in the 1880s. The views enunciated by Ballance were hardly radical. Rather it is the position of the Crown Lands Department that requires further examination (see section 5.3).

Attitudes to afforestation were also important. Vogel sought to end official incentive schemes for encouraging private planting; little had been achieved under these anyway (see AJLC, 1877, No 24). He conceded that Government planting might be required on the treeless plains, but favoured indigenous management over exotic afforestation. Besides, afforestation might have occurred on lands fit for settlement. Not everyone accepted that precedence should be given to indigenous forests. Rolleston echoed old arguments that indigenous forests were doomed to extinction: "with regard to the conservation of existing forests very little can be done" (NZPD, 1885, 51, 207). This view was not limited to members from the treeless plains of Canterbury; for example John Buckland also considered that indigenous forests could not be successfully conserved:

> "I speak with large experience of the forests of New Zealand, and, I have a deep feeling of regret that our forests are likely to disappear, but, still, I cannot help thinking that the task of conserving them is useless"
>
> (NZPD, 1885, 51, 205)

The conflict between land settlement and forest management, which was to attain peak importance in the 1890s, was also touched upon. George Beetham spoke in the House of the inevitable conflicts that would occur between forest conservation and settlement unless there

was careful administration. He echoed the concern of many aspiring small land holders when he stated:

> "we have to consider how settlement is to progress in these districts if we are to lock up[3] large areas of land as forest reserves"
> (NZPD, 1885, 51, 206)

It was no simple matter to reconcile forest uses with land settlement. Yet this was a requirement for forest management to become successfully institutionalised. Ballance acknowledged that much timber was wasted "in the progress of Colonization" (NZPD, 1885, 51, 209) even if the Crown Lands reports of the period did not regard this as wasteful use. Beetham was aware that the pressure for land was pushing settlement onto areas not suited to that purpose - land which could be better left in forest:

> "I know that the government are now selling large quantities of inferior land which might be better utilised for forest reserves"
> (NZPD, 1885, 51, 206)

Ballance did not openly acknowledge that this was indeed the case and that the margins of settlement were over-extended, but offered the compromise suggestion that,

> "every available tract of land not fit for settlement shall be reserved for forest purposes, and that the recovery measures shall be taken to prevent the timber upon it being destroyed"
> (NZPD, 1885, 51, 209)

The stance adopted by Ballance indicated that some gradual acceptance of forest reserves and forestry as a landuse had occurred. Even so, forest landuses were very much in an inferior position; land unsuited for settlement would be left for forest reserves, producing a distinctive geographical pattern of reservations favouring upland areas. On

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3. This is one of the earlier utterances of this phrase, particularly favoured by those advocating land development for agriculture, timber milling or mineral development over reserving lands for conservation and preservation.

forested lands equally fitted for settlement or forest uses the former prevailed. This policy was adhered to even where lands were marginal for settlement. The popular pressures favoured the opening of lands for settlement were considerable and the delimitation of marginal lands only vaguely understood.[4] Dedicating lands and forest reserves was very much a default option employed when areas were unlikely to ever be of use for settlement.

The Forests Bill of 1885 was passed into law. The reaction outside parliament was perhaps stronger than that inside. Morgan (1886), in a commentary on the act, demonstrated a concern for timber supplies. "Is it not an established fact", he wrote,

> "that the forests of the Colony are disappearing at an amazing rate - that the timber industry, the settlers axe, and the ravages of fire are making vast inroads into the numerous bushes in both islands?"
> (Morgan, 1886, 121)

The solution in Morgen's view lay in "creating new forests"; he was critical of the act because it did not contain the necessary provisions to undertake this. Advocates of afforestation were not new, and assumptions about the "weakness" of the indigenous flora and ease of planting exotic species usually underlay this viewpoint.

Another viewpoint on the State Forests Act, 1885 was provided by Richard Monk, MP for Waitemata and a member of the Waitemata County Council, in 1886. Monk had a long and successful business career in the Auckland timber industry (Stone, 1973, 100). His opinions are of interest because of his background in the timber industry.

Monk successfully proposed four resolutions at a meeting of the Waitemata County Council:

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4. A Study of the South Australian Wheat Frontier (Meinig, 1962) remains an excellent example of European maladjustment to marginal lands.

1. the State Forest Act was inadequate and inapplicable to the needs of the Auckland region

2. the State Forest Act would not prevent inefficient use or reduce losses by fire

3. forests require greater protection

4. comprehensive forest regulations adopted to the needs of the county were required.

In an address accompanying the meeting and subsequently printed (Monk, 1886) he indicated a belief in forestry as an enduring landuse in much of the Auckland region:

> "The people of this province are possessed of large tracts of land, that the forest now growing upon them is the 'best'[5] and most valuable crop they can produce, and upon very much of these lands perhaps forest is the only crop of value it ever will produce"
> (Monk, 1886, 5)

He did not attempt to disguise the existence of wasteful use, claiming that 340 million marketable Kauri trees had been destroyed since 1850. The magnitude of the fire hazard was also reiterated. The future of the Kauri timber industry was, in Monk's view, threatened:

> "Under the best system of conservation about twenty five years will bring in the closing phases of our Kauri bushes."
> (Monk, 1886, 7)

Only the strictest regulation would suffice.

The essentially undisputed passage of the State Forests Act, 1885 suggests that it was not regarded as a radical proposal. Equally important, however, was the absence of political impediments in the form of provincial allegiances. The designation of land as State Forests was no longer a stumbling block as it had been in 1874. Vogel still included climatic conservation as a purpose of the Act. These ideas

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5. The term "best use" was repeatedly used by Harry Ell, Member of the House of Representatives from 1899-1919, and parliamentary champion of forest conservation from 1900 (see Chapter VI and Roche, 1979).

had gained some popular and official recognition in the form of reserves for the growth and preservation of timber established under the Land Act, 1877. Perhaps he felt no need to emphasise these aspects in 1885; similarly, the details of rotational forestry were muted. Doubtless the question of financial returns was more to his liking. The State Forests Act, 1885 should be viewed in the context of a return to a policy of bold borrowing and natural resource development to rescue the colony from economic depression.

5.6 THOMAS KIRK AS CHIEF CONSERVATOR OF FORESTS 1886-1889

The sustained and authoritative interest that Kirk had displayed in forestry since the mid 1870s led the Under Secretary for Lands to reach the conclusion that, "He is under the circumstances the person upon whom the appointment of Chief Conservator should be conferred" (Under Secretary of Lands to Ballance, 15.12.85, LS 53/1). The appointment of Kirk as head of the Forests and Agriculture Branch of the Lands Department invites comparison with the employment of Dr Deitrich Brandis as Inspector-General of the Forests of India in 1864 (Winters, 1975). Kirk and Brandis were both botanists by training rather than professional foresters. However, they displayed a keen interest in scientific forestry and through personal energy and endeavour each expanded State forest operations. Kirk's achievements were particularly meritorious in view of the lack of specialised assistance he received and pressures upon State forestry to be financially remunerative.

As Chief Conservator of Forests, Kirk headed a staff of eighteen spread from Invercargill to Hokianga. In addition, the Chairman of County Councils, nominal appointments as Conservators of Forests, were able to exercise general supervision at a local level. The Chief

Surveyor in each Land District was also accorded the honorary title of Inspector of Forests. An often expressed opinion in the 1870s favoured local administration of forests. Professional foresters such as Campbell Walker and Lecoy did not share this opinion. In practise Kirk virtually single-handed was responsible for selecting, classifying and proclaiming State Forests, preparing working plans, deciding where to establish plantations, arranging protection from fire and illegal cutting, and providing advice to settlers on plantations and fruit trees.

One of Kirk's first actions to improve the management of indigenous forests was to issue new regulations. These appeared in the New Zealand Gazette of September 2nd 1886. Kirk indicated in his first annual report that the purpose of these new regulations was fourfold:

1. to secure sufficient areas to ensure a degree of permanence in milling operations, licences and returns of capital
2. to give the licensee a direct interest in preventing wasteful conversion and diminish the fire risk
3. to prevent unnecessary injury to young growth and ensure the natural regeneration of the forest
4. to facilitate effective forest supervision.

The regulations outlined the general duties of the forest administrators, provided a classification system for State forests and included revised provisions for timber and sawmill licences. For the most part, Kirk was adjusting or modifying existing procedures. He accomplished this by drawing upon earlier regulations such as those issued for Southland in 1882 and Lecoy's suggestions. Some of the regulations represent a significant departure from earlier thinking.

A major example of a new official conception of forests is evident in the division of Crown forests into three classes:

I. Mountain (or Climate) Reserves - for the protection of springs, streams, rivers, and the climatic reasons. These forests could only be felled by special selection and then never more than one sixth of the area in any single year

II. Forest Reserves - This class included plantations. Felling was to be undertaken by periodic selection on rotational felling at the Chief Conservator's direction

III. Timber Reserves - for the purpose of preserving timber until it could be profitably converted. Once cleared they either became Waste Lands of the Crown or were proclaimed on class II forest lands.

This division varied from that described in the Schedule of the State Forests Act, 1885 (see section 5.5). The Mountain Reserves category indicated the protection forests did occupy a place in forest management as conceived of by Kirk. However, it is interesting to note that Mountain Reserves were not regarded as inviolable and that up to a sixth of their area could be felled. The novel aspect of class II Forest Reserves concerns the melding of indigenous forest and exotic plantation under the one category. The two on the whole had typically been separately regarded. Kirk did not outline in detail the future role of exotic plantations. He did however remark that class II reserves would "ultimately include the bulk of our convertible timber, whether Kauri, rimu, totara, oaks or other kinds" (AJHR, 1886, C3D, 3). Although proposing rotational felling he seemed to accept some exotic planting. This was consistent with his stance regarding possible timber shortages. It is interesting to note that Kirk suggested Oaks rather than Eucalypts or various species of Pine which were the more popular choice.

Timber Reserves were intended to ensure the more efficient clearing of forests. They were to be held back until the value of the timber therein was sufficient to temper wasteful felling. Kirk anticipated that this work could provide "employment for settlers of limited

means" (AJHR, 1886, C3D, 3). Once cleared, these lands could be turned over to settlement. Class III Timber Reserves were an attempt to provide an acceptable compromise between the demands of State forestry and land settlement.

A number of new timber regulations were introduced. These included a requirement that sketch plans be submitted[6] and a restriction in felling, to limit it to suitable trees branded "SF". Other new regulations related to penalties for illegal cutting, damaging young growth and the removal of logs, tops and bark within a specified period.

The Sawmill licence regulations were also revised. Licence areas were now a maximum of 200 acres with three adjacent areas of 100 acres reserved for the subsequent exclusive use of the saw miller. This style of regulation for sawmills had previously existed in Otago. It was now operative throughout the entire colony. The means of calculating payment for timber licences was also changed. Lecoy had criticised existing royalty systems on sawn timber because they neither encouraged efficient use nor maximised the revenue obtainable. Kirk shared this opinion. He altered the basis of the royalty payment system so that it was calculated on the standing forest and not the sawn output. Royalty payments were graduated according to the species and dimensions (Table 5.9). Kirk's intention was to bring the costs to bear on the saw miller rather than on the forest resource. "Hitherto" he observed,

> "however carefully a bush may have been worked or however carelessly a sawmiller may have been managed all the loss has fallen on the forest"
>
> (AJHR, 1887, C4, 4)

Recognising the immense proportions of the task ahead, Kirk developed a list of priorities:

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6. Previously this was not required in all areas of the colony.

Table 5.9

ROYALTIES PAYABLE BY PURCHASERS OF TIMBER IN STATE FORESTS

Class	Description	Royalty per 100 sp ft
I	Totara and Matai over 40 ft by 2 ft diameter at base	2/-
II	Totara and Matai 25 to 40 ft by 1 ft to 2 ft diameter at base and Puriri, Maire-raunui and Pohutu-kawa	1/6
III	Kauri	1/3
IV	Totara and Matai under 25 ft by 1 ft and Miro, Rata, Tangeao, Beech, Manuaka, etc	1/-
V	Rewarewa, Mapau, Toro, Hinau, Tarairi	9d
VI	Mountain and Silver Beech	6d
VII	Rimu, Kahikatea, Kamai, Tawa	3d
VIII	Puriri, Totara, Kauri and Matai posts under class I to IV	per hundred
IX	Other posts and rails Fencing stakes Firewood	4/- 2/- 1/- per cord

Source: New Zealand Gazette, No 18, 2 September 1886.

> "The most important work to be taken in hand during the present season is the classification of forest reserves, which will necessitate a detailed examination of each forest preparatory to laying down a plan for its future management"
>
> (AJHR, 1886, C3D, 3)

It was anticipated that this task would occupy several years.

The pattern of State Forest reservations under Kirk is indicated by Figure 5.1 and 5.2. By 1889, when the Forests and Agriculture Branch of the Lands Department was disbanded, in excess of 1.3 million acres of State Forest had been gazetted. This was more than double the area prior to Kirk's appointment. In 1887, Kirk provided a detailed Schedule of State Forests as an appendix to his annual report. This data was indicated on a county basis and indicates at a fairly local level, the progress of forest reservation (Figure 5.3, 5.4). Some forests had been reserved in two thirds of the North Island counties, although in the case of seven this was very small; less than 0.1 percent of the county area. Only three counties had between 9-14 percent of their area set aside as a class of forest reserve. With only two exceptions all were classed as class II Forest Reserves. Nearly two thirds of the South Island counties had some form of forest reserves. Only four, including heavily forested Westland, had less than 0.1 percent of their land area reserved. Although only two counties had more than nine percent of their area reserved, the bulk of the remaining counties had greater forest reserves than their North Island counterparts. The South Island reserves were also spread over climatic forest and plantation classes. The latter were concentrated on the treeless Canterbury Plains and Central Otago.

An indication of the wide ranging interest that Kirk displayed in forest issues is provided by his efforts in July 1886 to have an export duty on baulk[7] Kauri imposed with the purpose of encouraging local

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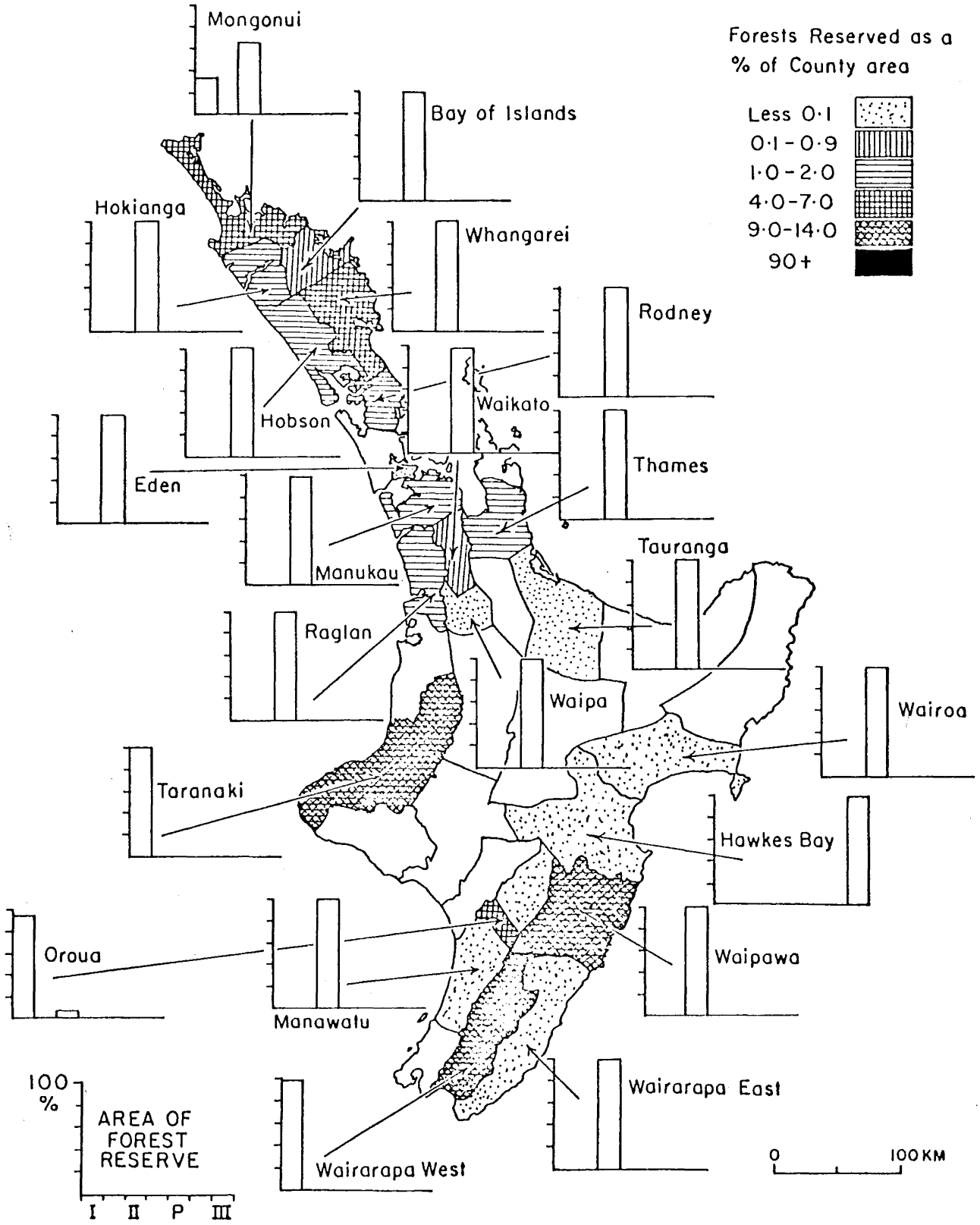
7. Baulk refers to roughly squared lengths of timber.

Figure 5.3

FORESTS RESERVED BY COUNTY TO 1887 (NORTH ISLAND)

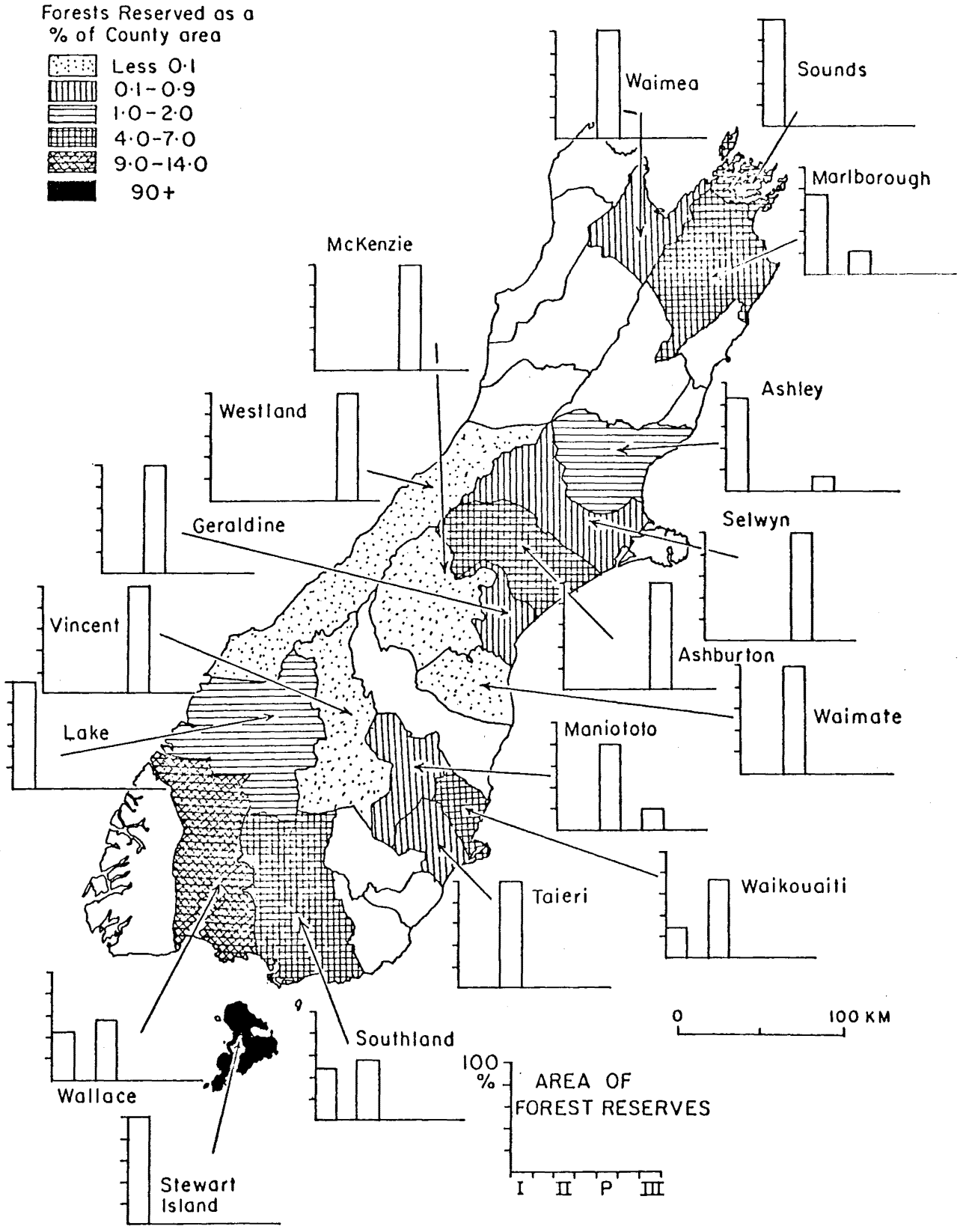


I Climate Reserve II Forest Reserve P Plantation Reserve III Timber Reserve

AJHR, 1887, C3

Figure 5.4

FORESTS RESERVED BY COUNTY TO 1887 (SOUTH ISLAND)



I Climate Reserve II Forest Reserve P Plantation Reserve III Timber Reserve

AJHR, 1887, C3

conversion of the timber. In this way he hoped to employ local labour in a task that was then being undertaken by Australian saw mills. The impending exhaustion of Kauri supplies added urgency to the matter. Kirk was not alone in raising the question of an export duty on Kauri baulk. Edwin Mitchelson, Kauri mill owner, timber merchant, and M.P. for Marsden, also advocated this course of action. Earlier in 1886 he had written to Vogel urging the imposition of an export duty of 21/- per 100 superficial feet on baulk and all Kauri logs. The latter was referred to Ballance, the Minister of Lands (Mitchelson to Vogel, 17.2.86, LS 53/1). On this occasion the advocates were unsuccessful. The politicians were unwilling to adopt the little-taken step of export duty especially at a time of worsening widespread economic depression in New Zealand.

Kirk's expansive correspondence provides further evidence of his breadth of interest in forestry. As well as dealing with all nature of enquiries to the Forests and Agriculture branch, he corresponded with Government foresters and botanists in many states. The more prominent examples included John Brown of the Woods and Forests Department in Adelaide, South Australia; George Perrin, the Conservator of Forests in Hobart who later played an important role in Australian (Powell, 1976) and New Zealand forestry; Baron Von Mueller in Australia and Sir Joseph Dalton Hooker at Kew Gardens. Von Mueller played an important role in forestry development in Australia (Powell, 1976) and Hooker had elaborated on the displacement concept as it related to New Zealand as well as commenting upon forest conservation in the colony.

The Stout-Vogel Government, which had returned to the bold borrowing policies of the 1870s, was ousted in the 1887 elections. Economic depression was widely felt throughout the colony. The frozen meat

market had collapsed and investors were leaving New Zealand (Bassett, 1975, 135). Harry Atkinson formed a new Government. He was again the harbinger of the dissolution of State forestry in New Zealand. Atkinson's financial policies centred on prudent borrowing and balancing the books. At one time he considered abolishing the entire Public Works Department as a retrenchment measure. The Governor's salary was reduced as were Members of the House of Representatives. Departmental appropriations were reduced. It was only a matter of time before the Forests Branch of the Lands Department was disbanded. This occurred in 1889 and although Kirk was able to point to £4000 revenue obtained from the forests it was to no avail. The old arguments, that if profitable forestry would be undertaken by private enterprise and that administration could be more effectively undertaken by local bodies, were reiterated. These criticisms show a fundamental misunderstanding of the goals of scientific State forestry.

5.7 THE ACHIEVEMENTS OF THOMAS KIRK AS CHIEF CONSERVATOR OF FORESTS

Kirk as Chief Conservator of Forests formulated the first forestry regulations applicable over the entire colony. He devised a classification system and began the task of designating Crown forests. Campbell Walker, in his 1877 report, had identified some of the conflict of interests between settlement and State Forestry. Kirk was equally aware of these problems. However, whereas Campbell Walker made suggestions that were antagonistic to settlement goals, Kirk proposed a compromise solution in the form of Class III Timber Reserves. This device was intended to facilitate the more efficient utilization of forest lands by opening them to felling when they could be profitably converted, afterwards they might be thrown open for settlement.

In 1887 Kirk expressed satisfaction with the new regulations:

> "New forest regulations have been brought into force throughout the whole colony with satisfaction to that portion of the community most directly interested, the enormous waste and robbery carried on for many years past has been greatly reduced"
> (AJHR, 1887, C4, 1)

From a twentieth century forester's perspective these regulations are "still admired" (Brown, 1968, 8). The forest regulations of 1887 indicate something of Kirk's ideas about the realm of forestry. The lack of professional training as a forester was perhaps an advantage, for it freed him from some forestry dogma and allowed him to adapt a more flexible attitude to the settlement/forestry issue.

Kirk's contribution, although frustrated in 1889, was still considerable, but should not be allowed to completely overshadow interest in the forest question in New Zealand in the late 1870s and early 1880s. Lecoy was the first to amplify the financial dimensions of State forestry in a quantitative fashion, albeit that he was excessive in his estimates. Three suggestions made by Lecoy were apparently taken up by Kirk. These were the branding of standing timber for sale, and more importantly, the imposition of an export duty on timber and changing the basis of transferring cutting rights to a saw miller. Lecoy was critical of licences and royalties on sawn output and favoured disposal on the basis of standing volume. Kirk could not entirely adopt this particular suggestion, he had not the resources to operate such a system, but did institute a royalty based on assessments of standing timber. The Southland Sawmill regulations of 1882 also provided some models for the 1887 revision. However, although the ideas were not all Kirk's, he was responsible for their synthesis and implementation.

Kirk was also aided by contemporary official response to forestry. The bitterness and misunderstanding that had surrounded Campbell Walker during his time in the colony had dissipated. The State Forests Act,

1885 was passed with little real dissention. Kirk initially, at least, was not faced with total opposition to State forestry. Probably his greatest disappointment would have stemmed from a denial of the time required to institute a functional system of rotational forestry. However, in view of the lack of essential information on indigenous growth rates, it is likely that problems would have eventually emerged in such a scheme.

The abolition of the Forests Branch of the Lands Department in 1889, although influenced by the small revenues, obtained to them was essentially an exogenous retrenchment measure. This event does however, indicate the relatively insignificant position that State forests held in the Atkinson ministry. As a recent addition to the Government sector, it was one of the first to go. The opportunities presented by the 1874 Forests Act had been lost; in 1889 the second forestry initiative was thwarted.

Poole (1969) provides an interesting perspective on these events by suggesting too little was then understood in terms of the structure and composition of forests to pursue an active forest policy. He conceded that State forests created in the 1880s were useful, but believed greater areas could have been reserved. Poole also maintained that had the Forests and Agriculture Branch of the Lands Department not been disbanded this would have been to the ultimate detriment of State forestry because of the clash with settlement goals:

> "forestry would have collected around itself such a legacy of antagonism that it is at least conceivable that more harm than good could have been done:
> (Poole, 1969, 13)

The conclusion drawn by Poole from the 1880s was that "the times were not ripe for forestry", except for complete protection, which "always aroused bitter animosity in democratic countries" (Poole, 1969, 13).

This analysis may be challenged, as Poole appears to be judging

1880s forest management from the viewpoint of 1960s forestry science. The European and India Forestry Departments were well established by the 1880s. Doubtless Poole is correct in identifying the limited knowledge of the forest flora and small importance afforded to it as likely handicaps, but at the time Kirk was confident in his ability to pursue State forestry. The view that the Forests Branch by its abolition avoided "a legacy of antagonism" is perhaps too strong. Settlement goals had already established priority status by the 1870s. It was not a case of settlement overcoming forest interests, but rather one of the latter being accommodated by the former. To this end Class III Timber Reserves were one means of seeking efficient forest utilization without locking lands up from settlement. The assertion that the "times were not ripe for forestry" is an oversimplification of the events. Over 13 million acres of forest remained on Crown Land, the earlier the concern for State forestry, the greater the potential area that could be brought under management. Instead, Poole emphasised the difficulties in terms of competing landuses and levels of expertise in forestry science. Some of the attributes that Rakestraw (1972) identifies in forest history as written by professional foresters are illustrated by Poole's interpretation of events in the 1880s.

The functions of the Forests Branch were devolved within the Lands Department, where they were readily overshadowed by land settlements functions. For instance, an amendment to the State Forests Act in 1888 allowed forest lands to be withdrawn from State Forest designations. Forest administration remained in low profile into the 1890s, but new and powerful rationales for forest protection were emerging. Aesthetic and scientific arguments for forest preservation occurred with increasing frequency in the late 1880s. They added a new dimension to the course of forest management around the turn of the twentieth century.

CHAPTER VI

OLD AND NEW RATIONALES FOR FOREST MANAGEMENT: THE CONTRIBUTION OF OF SCIENCE AND SCENERY 1890-1900

6.1 INTRODUCTION

The 1890s were a watershed in the political and social development of New Zealand. This was also a time of renewed and more diverse interest in the colony's forests. The substantive concerns of this chapter are with themes already touched upon, such as settlement pressure on forestlands and the condition of the timber industry as well as new scientific and aesthetic rationales for forest protection. There was again increasing concern about the prospect of a timber famine, but in the virtual absence of professional forester, administrators never conceived of sustained yield management of indigenous forests. Officials did, however, take steps to reserve forests for purposes of flood protection. A closer examination of the reasoning employed reveals that older forest and climate relationships had been modified. A belief in the marked impact of forests on rainfall was discarded in favour of a buffering impact of vegetation on the incidence and intensity of flooding.

Significant new rationales for forest protection also gained momentum in the 1890s. Scientists and scientific organizations lobbied successfully for indigenous flora and fauna reserves for reasons of their intrinsic and applied scientific value. Other residents sought to persuade the government to reserve forest lands in order to protect the scenic beauty of the country. The beneficial results of such actions for the fledgling tourist industry were typically voiced in close association with scenic arguments (Moran, 1979). The first national park in New Zealand was gazetted in 1894. However, although

aesthetic components were present in this initiative it was not mainstream to forest management.[1] Aesthetic concerns over forests found more direct expression in the Land Act, 1892 and the Scenery Preservation Act, 1903 (Roche, 1979).

At a conceptual level, strikingly different appraisals of forest lands are evident in the simultaneous convergence of production and protection forestry, scenery preservation, and flora and fauna protection goals. This interaction inevitably produced conflicts and compromises between and within official, scientific and popular appraisals of forest resources. Examples exist of the persistence of old ideas, the modification of earlier beliefs and the emergence of new attitudes. An important underlying question is the degree to which stated reasons were the real motive for actions or merely acceptable justifications. The richness of the historical setting provides an environment in which the relative importance of individuals, key events and wider social and economic factors are delicately juxtapositioned with regard to developments in forest management.

6.2 LAND AND FOREST IN THE 1890S

In 1891 the Liberal party, then led by John Ballance, came to power and remained in office until 1912. As the expectations of the pioneers had not been realized in full, the Liberals accepted that, "it was necessary by political action to regulate the new economic and social order" (Sinclair, 1974, 172). Their programme of social and economic reform was highlighted by a new land tenure system, the Industrial Conciliation and Arbitration Act, and old age pensions. Female enfranchisement was enacted in 1893.

---

1. Harris (1974) fully discusses the evolution of the early national park movement in New Zealand.

The Liberal land reform programme was organized by John McKenzie who in his youth had witnessed crofters being dispossessed to make way for sheep grazing. The memory developed into vehement opposition to large landowning. Sinclair (1974), an historian, clearly indicates the central role of land policy in the new Liberal government:

> "The first object of the new Government was to encourage closer settlement; it was their belief that in this way they could reduce unemployment and bring about a more effective utilization of the country's resources. They also believed small farming to be desirable in itself. To this end they meant to ensure that Crown lands should be alienated only to genuine settlers; to repurchase the estates for subdivision; and by means of taxation to force great landowners to subdivide their properties"
> (Sinclair, 1974, 178)

Forest reserves and the timber industry had been in conflict with settlement goals in previous decades. This situation was in some respects exacerbated in the 1890s, given the importance of land reform to the Liberal's programme, especially as the expansion of small holdings eventually came mainly from the occupation of new lands rather than the subdivision of larger holdings. Between 1891 and 1911 three million acres of Maori land was purchased for subdivision.

In New Zealand, as in Australia and North America during the early nineteenth century, the height and lushness of the vegetation was taken as a direct indicator of soil fertility (Johnston, 1979, Powell, 1978). In modified form this belief persisted in New Zealand late into the nineteenth century, when forest land continued to be regarded as the most suitable locality for settlement. A Lands Department annual report outlined the official appraisal:

> "It is the nature of things that the finest timber grows as a rule on the lands best suited for settlement, and hence it is the first to disappear under the process of clearing"
> (AJHR, 1893, C1, 6)

The loss of the forest was considered an inevitable and not unbearable price of settlement. In the words of one member of the House of

Representatives, Thomas Kelly,

> "The best way of dealing with forest covered lands was to utilize it for agricultural purposes. The forest trees if not cut down and utilized would simply rot; they arrived at the state of maturity, and then declined ... the best way of using the land was to get it under grass as speedily as possible, and to get population on it."
>
> (NZPD, 1894, 85, 443)

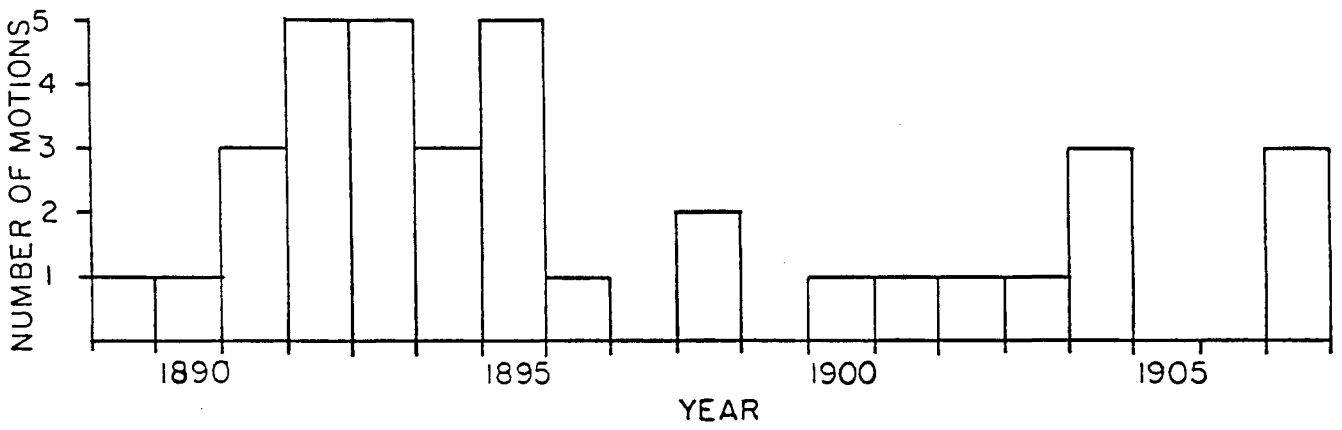
The demands of lands for settlement in the 1890s saw a renewed assault upon the Forest and the State Forest reserves created by Kirk a decade earlier. An amendment to the State Forests Act in 1888 had allowed the withdrawal of lands from State Forests by parliamentary consent. Parliamentary motions to release State Forest lands peaked during the early 1890s (Figure 6.1) but continued into the early twentieth century. The bulk of the motions referred to lands in the Marlborough and Southland Land Districts (Figure 6.2), although Wellington and Taranaki also attracted attention. The effects of the policy of resumption of State Forest lands were significant for, despite new reservations being made, the acreage of forest reserves dropped in 1893 and did not exceed its former extent until 1900 (Figure 6.3).

The resumption of State Forest Lands did not go unchallenged in Parliament. In 1891 McKenzie suffered a setback when he attempted to open 13 250 acres of Forest reserve in Southland for settlement (AJHR, 1891, C11). He was promptly attacked by William Rolleston, a former Minister of Lands, for tabling the motion in the last days of the session when there was little possibility of it receiving careful attention. Sir John Hall was also critical of the timing and insisted that "the preservation of a reasonable share of the forest lands of the colony was a matter of great importance" (NZPD, 1893, 74, 813). McKenzie in turn accused Hall of politicking. Both Rolleston and Hall were large land holders - an anathema to McKenzie.

As in the 1870s when the New Zealand Forests Bill became a vehicle

Figure 6.1

PARLIAMENTARY MOTIONS TO RESUME STATE FOREST LANDS 1889-1907



NZPD

Figure 6.2

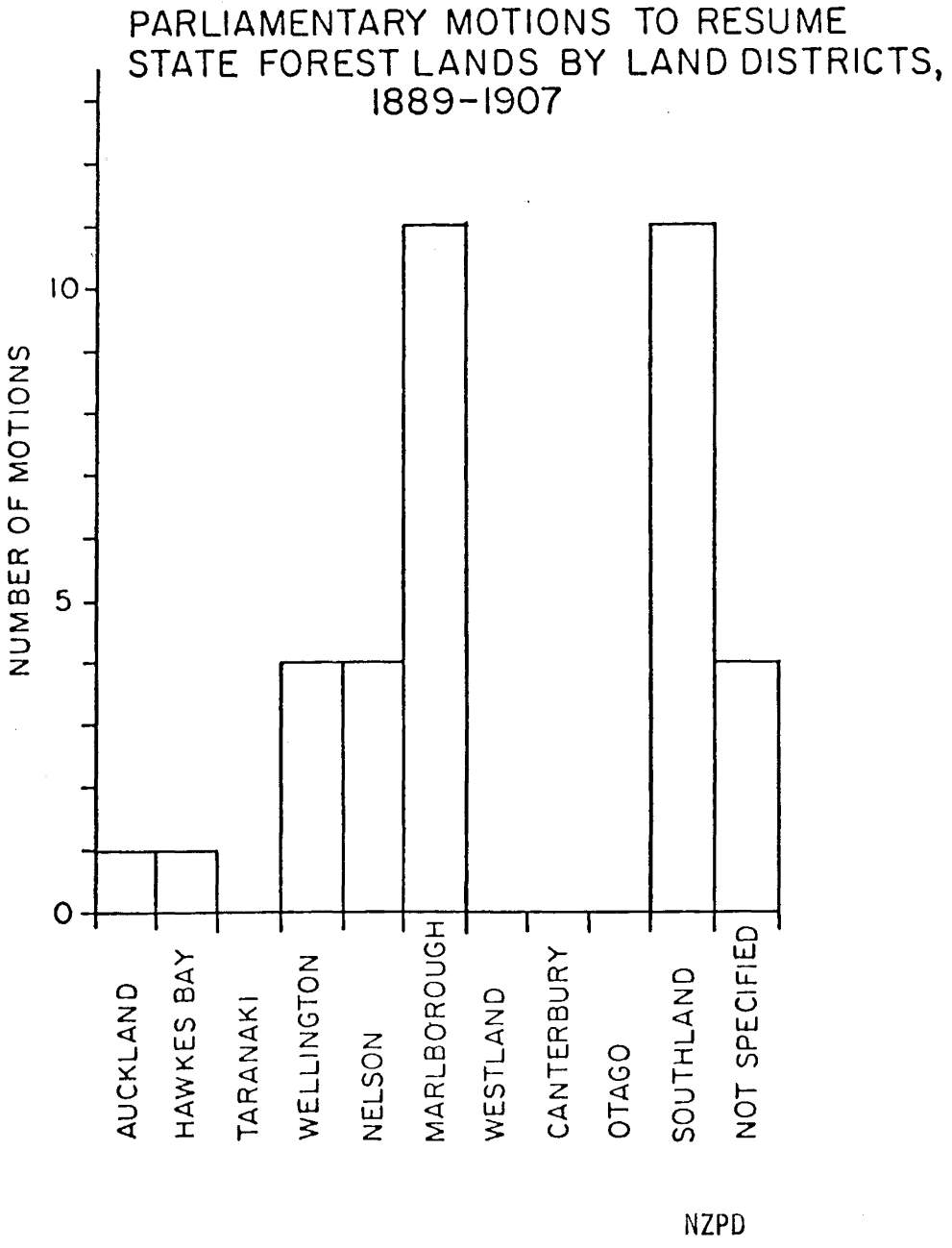
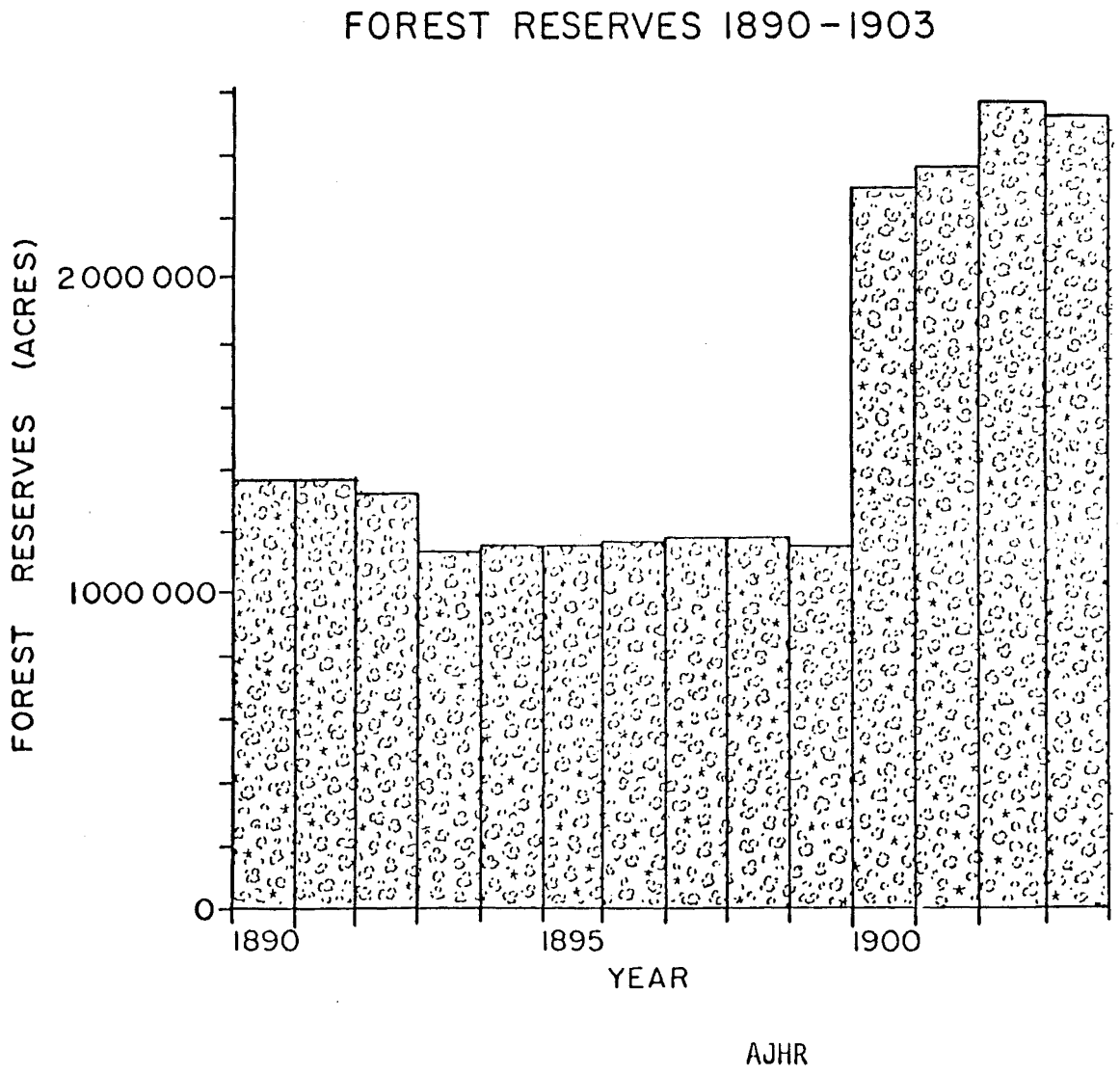

PARLIAMENTARY MOTIONS TO RESUME STATE FOREST LANDS BY LAND DISTRICTS, 1889-1907
NUMBER OF MOTIONS
0
5
10
AUCKLAND
HAWKES BAY
TARANAKI
WELLINGTON
NELSON
MARLBOROUGH
WESTLAND
CANTERBURY
OTAGO
SOUTHLAND
NOT SPECIFIED
NZPD

Figure 6.3


FOREST RESERVES 1890-1903
FOREST RESERVES (ACRES)
2000 000
1000 000
0
1890
1895
1900
YEAR
AJHR

for political jealousies, so in the 1890s it is possible that some of the opposition to State Forest revocations was not so much in support of State forestry, but to hinder the Government's land settlement strategy. Edward Richardson, a member of the Legislative Council and formerly a surveyor in Southland, insisted that the land McKenzie wished to release was unsuited to settlement. Only a minority raised their voices in support of forest reserves, although one member believed that,

> "instead of taking away forest reserves, they would do wisely to increase the area. The destruction of our forests had been going on at an amazing rate by persons who were paying a mere bagatelle to the Government per annum"
>
> (NZPD, 1891, 74, 818)

Ballance came to McKenzie's aid by stressing that it was a "well known fact" that areas of some forest reserves were unsuited for forest purposes but were fit for settlement. He continued in pragmatic fashion:

> "His opinion was that these portions which were fit for settlement should be used for that purpose under the forest law, and the proceeds of the land should go for forest conservation"
>
> (NZPD, 1891, 74, 817)

In practice however, this rationalisation was difficult to effect, for settlement and forest reserves in proximity proved detrimental to each-other. The Crown Lands reports of 1890 and 1891 highlighted some of the difficulties:

> "Experience has shown that the reservation of small forest areas in immediate contiguity to lands undergoing the process of clearing and settlement is a mistake: they cannot be preserved from fire due to the annual burning of the cleared areas and soon become a danger to surrounding areas"
>
> (AJHR, 1890, C1, 5)

The Legislative Council was not receptive to McKenzie's wish to withdraw forest lands for settlement in 1891. Charles Bowen, in expressing his opposition, referred to "a great tendency now to destroy all the forests in the country on the most trivial local pressure" and

that the short notice given by McKenzie was a "contradiction to the spirit of the Act" (NZPD, 1891, 74, 924). In 1893 the Government was again frustrated in its attempt to revoke forest lands by the Legislative Council. On this occasion Daniel Pollen pointed out a paradoxical aspect of the Liberals' policy:

> "it seemed to be a piece of absolute folly that on the one hand public property should be given for encouraging tree planting,[2] while on the other they allowed the native forest which could not be replaced to be sacrificed"
>
> (NZPD, 1893, 80, 479)

On other occasions, the Government was successful in its attempts to revoke forest lands for settlement purposes.

One outcome of expanded land settlement was the further reduction in the extent of forest cover. The Lands Department estimated that 1 064 718 acres of forest land had been cleared for grass or cultivation from 1895 to 1901 (AJHR, 1901, C1, ix). Cumberland (1941) estimated that for the decade 1890-1900, 9 000 000 acres of forest were cleared at a rate five times greater than that of the previous fifty years.

The extent of forest clearance hints that marginal lands were being taken up for settlement. The pressure for settlement was such that Lands Department administrators felt they could consider forest conservation in only a few instances,

> "except where mill timber is involved or special beauty spots are to be found, as secondary to the profitable occupation and utilization of land"
>
> (AJHR, 1904, C1, xix)

Marchant, the Surveyor General, felt obliged to offer further explanation for this statement in 1904, as in previous years he had strongly

---

2. The State Forests Amendment Act, 1888 revived the Forest Tree Planting Encouragement Act provisions originally dispensed with by Vogel in 1885.

advocated forest conservation for timber supplies, soil and water and scenery preservation (see section 6.5). "I can only say", he wrote that,

> "I have been forced to reach the above conclusion by actual observation and from a conviction that *bona fide* settlement is the first consideration in New Zealand, and that we should do everything in our power to improve the position of settlers and to meet their altered requirements.
> (AJHR, 1904, C1, xix)

It is not inconceivable that Marchant was pressured to revise his views because they seemed to challenge the primacy of settlement. He was not alone in this concern. Various Lands Department circulars testify to a growing opinion within the administration that several detrimental aspects of settlement existed. Circular No 272 of 1894 required Crown Lands Rangers to inquire into the amount of damage caused to the public through settlers burning the bush on their properties. Similarly, circular No 532 of 1902 urged the Land Boards to allow settlers to "utilize valuable timber upon their sections and to conserve areas for shelter and ornamental purposes" (Surveyor General Circulars No 532, 1902) rather than strictly insisting upon the "improvement" (ie. forest clearance) conditions laid down in the Land Act.

The 1890s emerge as an enigmatic period. Forest reserves were revoked and the primacy of land for settlement over other landuses was sanctified by the Liberal Government. However, in this same decade, the condition of the timber industry was reassessed, reserves for the protection of use and water were made and new rationales for forest conservation based on aesthetic and scientific considerations were accepted as the basis for new types of forest reserves (see sections 6.5, 6.6). Gradually forest uses gained an official, albeit restricted, acceptance as an appropriate landuse.

6.3 THE TIMBER INDUSTRY IN THE 1890S

Concern expressed over the economic ills of the timber industry led to a conference of millowners and timber merchants in 1896 (AJHR, 1896, H24). Simpson (1973) is the only forest historian to consider this episode in any detail and then with overly lavish praise:

> "The convening of the conference by the Seddon Government was the first practical manifestation of an appreciation by any Government of the importance of the industry to the economy of the country."
> (Simpson, 1973, 243)

This view discounts the contribution made by Vogel, Campbell Walker and Kirk in previous years (see Chapters III, IV and V).

Opening the Timber Conference, Premier Richard Seddon addressed the delegates from throughout New Zealand (Table 6.1) on the importance and condition of the industry, and the means by which it could be revitalised. Seddon emphasised the importance of the timber industry:

> "You have been called together to deal with one of the most important industries that we have in New Zealand ... an industry which, to my mind, in the past has been greatly neglected, and it is only now that we are waking up to the fact that unless some steps are taken, steps of a practical character, the result will be detrimental to our country"
> (AJHR, 1896, H24, 6)

The timber industry was not usually addressed in such positive terms; most commentators fixed upon the wasteful use of forest resources. Seddon continued to compare the merits of farming and saw milling:

> "Carrying out the old worn out idea - the bush has been burnt by the thousands of acres. Millions of feet of valuable timber have been burnt never to be replaced. What is the result? Why, the man who reserves his timber, lets it stand, he will get more Royalty from the timber than he would for a farm fenced and complete"
> (AJHR, 1896, H24, 7)

Later in his opening address, he returned to the desire of the bush farmer to sow grasslands:

Table 6.1

PARTICIPANTS IN THE TIMBER CONFERENCE, WELLINGTON 1896

Located	Organization Represented			
	Timber Merchants and sawmillers	Builders	Foresters	Miscellaneous
Auckland	6[1.]	1		
Hawkes Bay	7	-		
Wellington	18	1		5[2.]
Taranaki	4	1		
Nelson	2	-		
Marlborough	3	1		
Canterbury	4	-		
Westland	9	2		1
Otago	2	-		
Southland	7	1		
Australia			1[3.]	

Compiled from AJHR, 1896, H24.

Notes:

1. Including Edwin Michelson who advocated export duty on Kauri in the 1880s

2. Including Professor Thomas Kirk, Chief Conservator of Forests in 1886-1889

3. G S Perrin, later prominent in Australian forestry (Powell, 1976).

> "Well I think myself that there is something wrong here, because that same land - or the value of the timber upon that land - is much more valuable than the land on which he had the timber burnt sown in grass and fenced"
> (AJHR, 1896, H24, 8)

A closer reading of those statements indicates that Seddon was not questioning the merits of small landholding so important to the Liberals, but was challenging the nation that the economic basis of settlement would invariably be grasslands.

Seddon identified an oversupply of timber as the major problem facing the industry. His solution, in line with confident Victorian expectations of "progress" and growth, was straightforward: develop export markets to take up the excess production. This he was willing to encourage through Government transport incentives.

Seddon's direct involvement ended with his address. The conference continued with the future of the industry and the Prime Minister's speech much discussed. Eventually five sub-committees reported on various aspects of the timber industry. Their findings were summarized in the Chairman's report to Seddon. The delegates did not favour a closed season on timber felling, which they argued would make many milling operations uneconomic because logs would have to be stock-piled to ensure year around operations. Instead they supported the more effective utilization of forests on lands intended for settlement, the conservation of existing forest, and the creation of plantations. It was also decided to send trial shipments to the European market.

There was considerable disagreement over the question of purchasing timber. Failure to reach a concensus led the Chairman to recommend two contrasting alternatives for government consideration: sale of timber by auction on the basis of estimated standing quantities or a royalty on cut timber. The latter option harkens back to the timber licensing system that operated in Southland during the 1870s. Lecoy had favoured

assessments based on the standing crop and this approach had been implemented by Kirk. Arguments that assessments of quantities of standing timber promoted more efficient forest utilization, because the millowners had already paid for the trees, were countered in two ways. Firstly, antagonists claimed that this led to conflicts between the valuator and the buyer over the estimated quantities of timber on given blocks of land. A second more serious reservation was that an auction system would allow syndicates and companies to outbid the small millowner of limited capital. This attitude was analogous to feeling against large landowners during the 1890s.

The self-image of those engaged in the timber industry is also evident from the conference proceedings. A striking example was provided by James Prouse, a Levin timber merchant, who claimed that,

> "timber millers as a class are the staunchest protectors of our forests; that while they remove from such forests the milling timber growing thereon, they do not touch the greater number of trees ... these trees are left to grow and flourish. The timber miller culls the forest, he does not destroy them, his interests are in totally different directions"
>
> (AJHR, 1896, H24, 28)

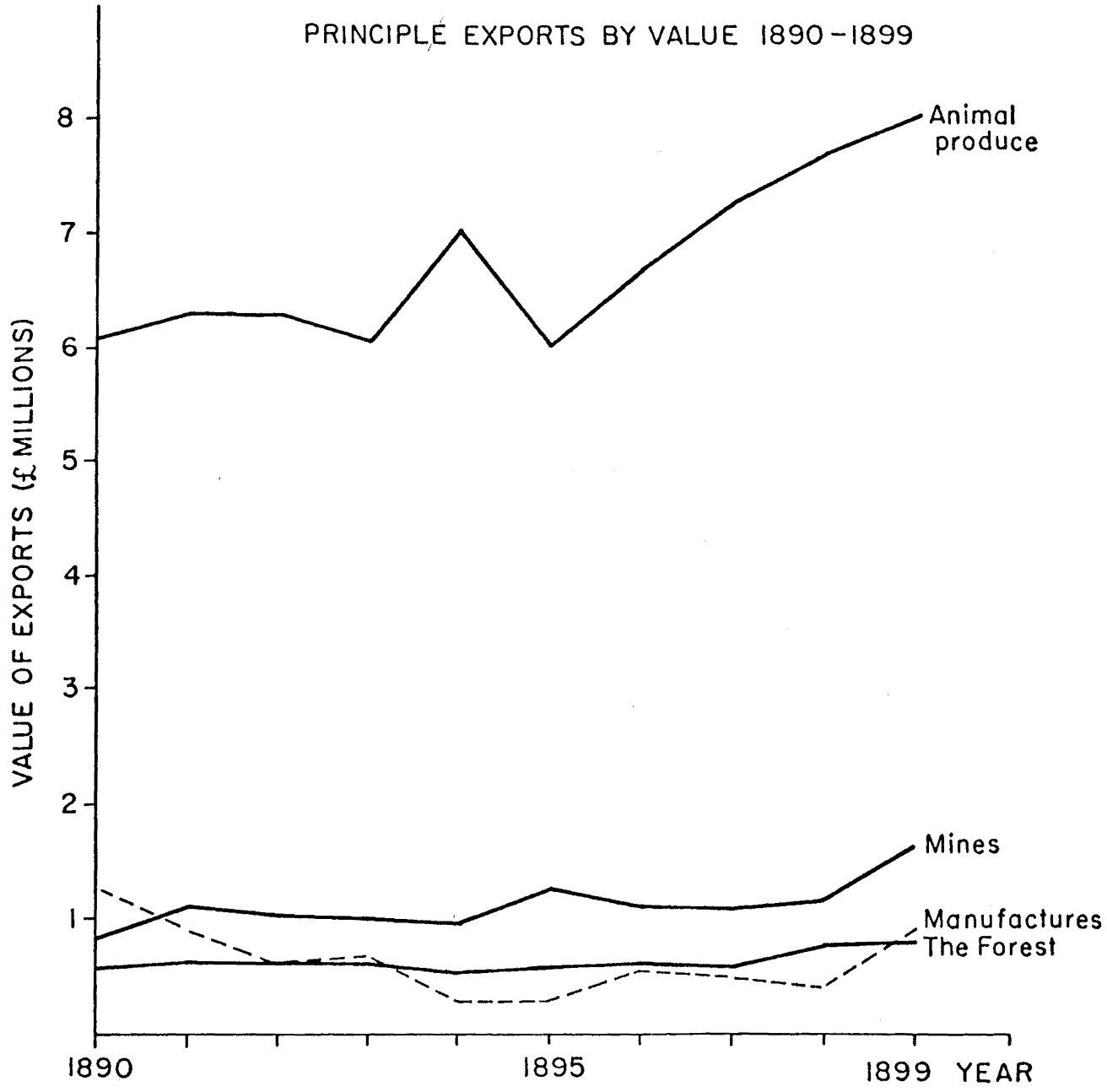
Yet, on balance, Prouse's claim is not supported by the weight of evidence. Even allowing that much forest was cleared for settlement with little involvement on the part of saw millers, the timber industry remained wasteful. This was particularly the case in the conversion of standing to sawn timber, where losses were incurred due to fire damage and retarded regeneration through clear and selection felling techniques. By the 1890s there was a strong belief in a coming timber famine. However, the favoured solution to this was not increased efficiency and encouragement of natural regeneration, but the creation of new stocks through exotic plantations.

Seddon's claims as to the importance of the timber industry warrant further attention. Arnold (1976) and Stone (1973) indicate that the

timber industry was of importance in Auckland and the Manawatu. This lends credence to Seddon's statements which might otherwise be dismissed as demagogy. In terms of export earning, agricultural and pastoral produce dominated the economy, but forests were significant amongst the second tier of export earners comprising forest products, mining and manufactures (Figure 6.4). On the basis of the number of plants, employees and value of output, the timber industry increases in prominance. Saw millers were the most numerous and most significant employers in the manufacturing sector in 1886, 1891 and 1896 (Table 6.2). This sketch of the industry places Seddon's remarks in context and throws into clearer perspective the milieu in which forest reserves were secured and forest management undertaken.

A further offshoot of the Timber Conference was another report on New Zealand forests by the Australian forester G S Perrin (AJHR, 1897, C8). In this report Perrin paid tribute to Campbell Walker's 1877 report. He voiced the usual concerns of foresters of the period: "the practical extinction within the next thirty or forty years" (AJHR, 1897, C8, 19) of timber supplies. This end, he believed, could only be averted by establishing a Forestry department with the power to secure permanent and inalienable forest reserves. However, he did envisage a place for State and private exotic afforestation as demand increased. Protection as well as production forests were advocated. He also urged sawmillers to cut on a rotational basis, thus ensuring continuous supplies. Perrin was particularly critical of political intrusions; "Political interference with the actual working of the forests apart from State policy, should be specially guarded against" (AJHR, 1897, C8, 3). The majority of these ideas had already been raised in earlier reports on the forests of New Zealand by Campbell Walker, Lecoy and Kirk (AJHR, 1877, C3, 1880, H3, 1881, H1, 1886, C3,

Figure 6.4



NZ Statistics

Table 6.2

THE SAWMILLING INDUSTRY 1886-1896

	1886			1891			1896		
	Number of Mills	Percentage of total of manufactures	Ranking of total of manufactures	Number of mills	Percentage of total of manufactures	Ranking of total of manufactures	Number of mills	Percentage of total of manufactures	Ranking of total of manufactures
Sawmills	268	13.8	1	243	10.8	1	299	12.2	1
Hands Employed	5 042	22.8	1	3 266	12.7	1	4 059	16.6	2
Value of Product (£)	1 177 713	17.5	1	832 959	9.5	4	898 807	9.4	3

Source: NZ Statistics, 1886, 1891, 1896.

C3A, C3B).

The novel section of Perrin's report was entitled the "Maintenance and Protection of Popular Tourist Resorts". Kirk in 1886 had referred to the injurious effects of indiscriminate timber cutting on the scenery at Lake Wanaka. But Perrin was more explicit in advocating that the Government preserve Queen Charlotte Sound, Pelorus Sound, the Southern Lakes, the central North Island volcanoes, and the Wanganui river:

> "conservation of such spots should be undertaken by the Government, as well as from the point of view of maintaining a supply of timber as from an aesthetic standpoint, seeing that this latter also has a commercial aspect which cannot be ignored."
>
> (AJHR, 1897, C8, 42)

Perrin also argued that settlement should be excluded from the above sites as more "suitable and profitable localities" were available for the purpose. For the most part Perrin voiced the arguments and concerns of the professional forester. His most significant departure from this course was in reference to scenery and tourism. This new concern represented a significant and increasingly important reappraisal of the forest resources of New Zealand.

6.4 PERSISTENT THEMES?: FOREST INFLUENCES REVISITED

Both Vogel in 1874 and Campbell Walker in 1877 drew attention to the importance of forest cover to flood protection, conservation of water supplies and the amelioration of climate. Direct links between forest cover and the amount of rainfall, as a rationale for forest protection persisted into the 1890s (eg. Hamilton, 1895).

These ideas were also seriously suggested before Parliament; for example by Dr Alfred Newman,[3] and William Buckland. Newman claimed that "forest destruction" was the cause of "the growing dryness of large parts of this island" (NZPD, 1889, 64, 126). Buckland was

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3. A conspicuous Parliamentary advocate for the establishment of Tongariro National Park.

stronger in his criticisms. He asserted that John McKenzie, the Minister of Lands, had disregarded the importance of forests in his desire to open lands for settlement:

> "He (McKenzie) did not understand the relations which the natural features of a forest bare to the rainfall, and, that if they denuded the hills of forest they might alter the forest so greatly that they might be subject to frightful droughts and sudden floods, and destroy the climate as they had done in some parts of Canada"
>
> (NZPD, 1891, 74, 816)

However, a discordance between expressed opinions and actual motives possibly exists in this instance. Buckland may have been sincere in his beliefs about forests and climate, but he was an opposition member of the House. Thus his recourse to forest influence ideas may have been as a lever to direct new criticism towards the Liberal's land policy rather than a championing of forest protection for its intrinsic value.

By the 1880s scientific opinion on the whole, began to swing away from supporting the idea that forests markedly influenced rainfall. A notable critic of this old idea was John Wesley Powell of the US Geological Survey (Powell, 1888). The popular viewpoint expressed by politicians such as Buckland lagged behind, although an increased emphasis on soil and water protection was evident by the 1890s.

Official Lands Department attitudes were also changing. Contacts between Government agencies, scientists and administrators in other corners of the British Empire facilitated these developments whereby a belief in the influence of forests on rainfall faded discreetly away and increased prominence was given to flood prevention and soil and water conservation. The extent of recent flood damage in 1898 prompted the Surveyor General, Stephenson Percy Smith,[4] to draw forest protection

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4. Later to become chairman of the Scenery Preservation Commission. See Roche (1979).

to the attention of the Commissioners of Crown Lands. Percy Smith's rationale was that "the denudation of the covering provided by Nature in the hills where the streams take their sources" (Surveyor General's Circulars, 1898, No 318) was responsible for the damage and urged reservations of the forest cover on mountain ranges and stream sources to counter the problem. The Surveyor General's circular indicates that a reinterpretation of environmental mechanisms had occurred. No longer were forests thought to attract precipitation while their role as a buffer against flooding was accepted. This view of the role of forests was not new, having been voiced in New Zealand twenty years earlier (eg. Dobson, 1871, Chapter III), but not until the 1890s did it gain dominance over the forest and rainfall ideas.

Another important change of stance evident in the Lands Department appraisal of forestlands was a recognition that some of the effects of settlement, particularly as it related to runoff, were not beneficial. The forests on watersheds were regarded as,

> "'sponges' to retain the rainfall and thus allow a gradual flow down the rivers instead of in the form of floods; for this no doubt is the end toward which the settlement operations are tending at the present day"
>
> (AJHR, 1898, C1, vi)

The central importance of land settlement to the Liberal Government in the 1890s has been referred to previously (section 6.2). Near the end of that decade it became apparent to some Lands Department administrators that the negative side effects of settlement in marginal lands outweighed the advantages. A graphic example of the extent of slumping and erosion was provided by Hill (1895) who circularized Hawkes Bay farmers on the extent of land slips following a storm in 1893. The returns from the owners of 1 158 277 acres indicated that 7 693 acres (0.66 percent) had been affected. The importance of forest cover to watershed protection was reiterated in the Lands Department reports of

1899 and 1900. Indeed, some reserves were made specifically for this purpose. A significant addition was the 371 160 acres reserved in Canterbury in 1899 (AJHR, 1899, C1, vi). The wider potentialities of forests were also beginning to be recognised in the 1890s. The Lands Department report of 1899 urged watershed forest protection, but noted other concerns:

> "connected to this subject, is of course the desirability of preserving the banks of many of the rivers for scenic purposes and the timber near them for commercial use hereafter"
>
> (AJHR, 1899, C1, vi)

In the 1890s and early 1900s, the initiative for forest protection, as in the 1870s, came from a small educated parliamentary and administrative elite. General acceptance was not forthcoming because of the conflicting claims of settlement for forested lands. Beyond this, the incompatibilities between various forest uses, such as timber production, flood prevention and scenery preservation became apparent as the century progressed.

6.5 SCIENTIFIC INITIATIVES FOR INDIGENOUS FLORA AND FAUNA PRESERVATION

Three phases of scientific interest are discernible from the 1830s to about 1900. Naturalist sojourners, such as Darwin in the 1830s comprised the first group; in turn they were followed by other scientists who collected and described the New Zealand flora (eg. Hooker, 1864) and fauna (Hutton, 1871, Buller, 1872). Analytical investigations followed later in the century. The high degree of endemism amongst New Zealand's flora and fauna did not escape the attention of early naturalists.

Initially scientists were concerned with cataloguing and obtaining specimens of the indigenous flora and fauna. However, the pressures of

new introductions[5] and the spread of European settlement placed more species under threat. Formerly abundant species became scarcer under the wider impacts of settlement. One reaction of naturalists was to regard this as a natural phenomena; the result of a stronger and more vigorous species displacing the weaker indigenous stock. This explanation retarded rather than encouraged protection measures because the displacement of species was portrayed as an inevitable natural process in which man was powerless to intervene. Another reaction, which gathered momentum during the late 1880s and early 1890s, was to seek the protection of the indigenous flora and fauna on island reserves. Ornithology was a favoured pursuit of nineteenth century naturalists in Britain. Not surprisingly, the earliest efforts of many New Zealand naturalists was centred around efforts to preserve examples of New Zealand's avifauna. This concern soon spread to the indigenous forest, for it was realized that the birdlife was dependent upon the forest environment for survival. The clearing of forest for settlement posed a direct threat to the birdlife where numbers were also reduced by introduced predators.

Two sites, Little Barrier Island in the Hauraki Gulf and Resolution Island in Fiordland were the focus of most attention (Figure 6.5). Later, Kapiti Island was suggested as a third reserve, thus providing northern, central, and southern sanctuaries.

Frederick Hutton, later to become a noted ornithologist, and Professor Kirk had first suggested Little Barrier Island be proclaimed a reserve for native birds as early as 1868 (Kirk, 1895, 26). The timing was coincident with Potts' attempts to draw attention to the condition of the forests. No action was forthcoming for nearly two

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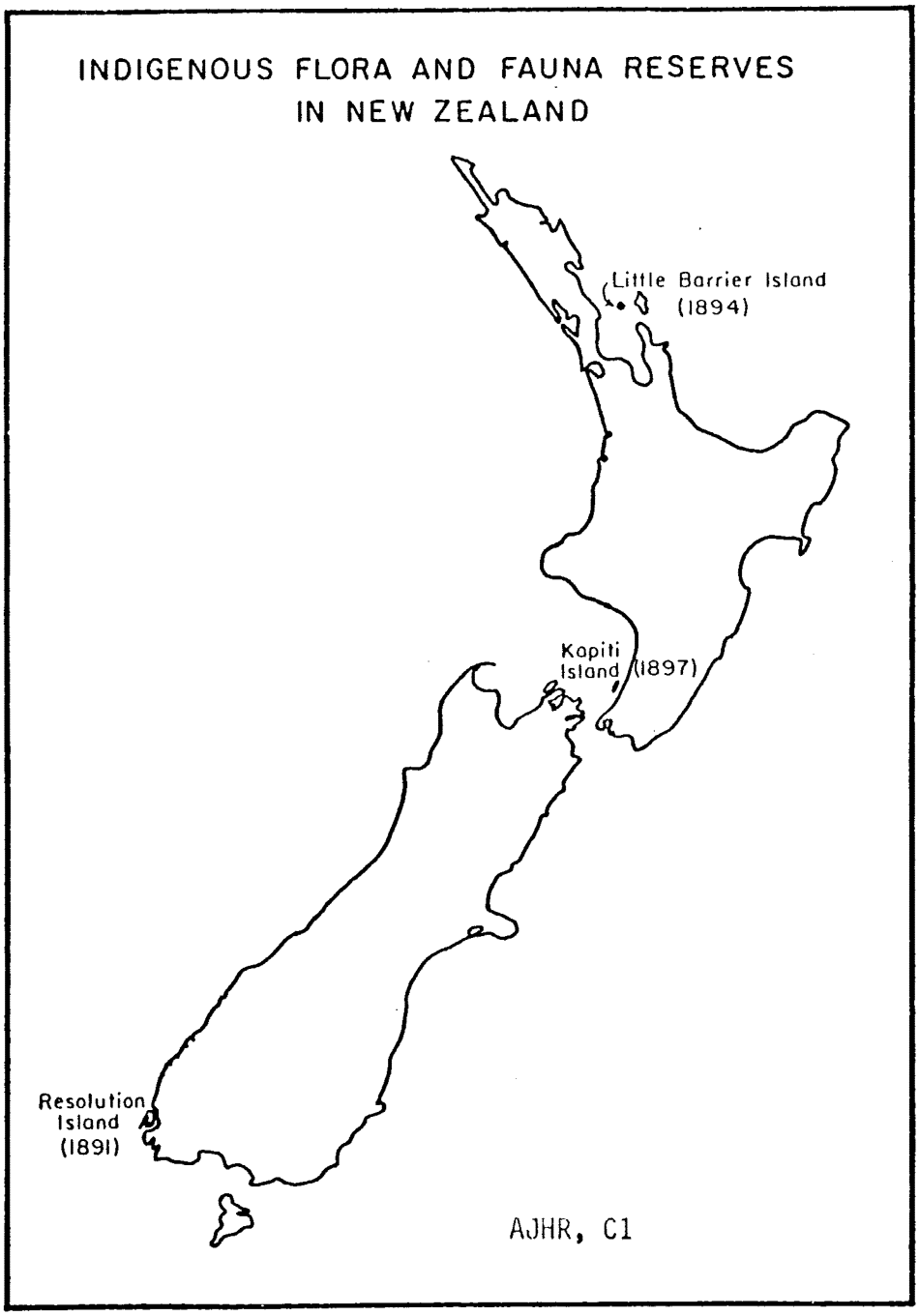
5. The journal Nature was critical of acclimatisation as early as 1872: "This ... silly mania for 'acclimatisation' which has been so warmly fostered by many well-meaning though ill-advised persons both at home and in the colonies, and nowhere more than in New Zealand" (Anon, 1872, 6, 219).

Figure 6.5


INDIGENOUS FLORA AND FAUNA RESERVES
IN NEW ZEALAND
Little Barrier Island
(1894)
Kapiti
Island (1897)
Resolution
Island
(1891)
AJHR, C1

decades until, in 1886, the Austrian collector and taxidermist Andreas Reischek revived the suggestion in a paper read in his absence by Professor Algernon Thomas before the Auckland Institute. Some years later in 1891 Professor Thomas played an important role in orchestrating scientific opinion over flora and fauna protection. Reischek's paper described the avifauna of Little Barrier Island and drew attention to its advantages as a reserve: few landing places, containing species already rare or extinct on the mainland, and suitable habitats for a wide range of species:

> "It would be of great benefit to science and agriculture to have such a means of preventing the extinction of these remarkable birds, which as they multiplied, could easily be transported to the mainland for the purpose of checking the insect pests"
> (Reischek, 1886, 18)

This passage, as well as illustrating Reischek's concern for avifauna protection also identifies his motives.[6] Reischek did not conceive of Little Barrier as a relict enclave of rare birds, but as a regenerating nursery from which restocking of the mainland could take place. Thus, Reischek's argument was practical as well as scientific. He predicted that indigenous birds might bring economic benefits by effectively checking the numbers of insect pests on the mainland.

Towards the end of 1886 the Auckland Institute wrote to Premier Robert Stout requesting the purchase of Little Barrier as a reserve. Stout approved of the suggestion, but multiple ownership of Maori land on the island slowed the purchase arrangements.

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6. Reischek was essentially a collector and in his dealings with the Maori frequently betrayed trusts to secure artifacts. There is also a duplicity about his stated concerns for flora and fauna protection on Little Barrier Island which rests uneasily with his other actions. On numerous occasions he shot rare bird species to add to his collection, probably in the full awareness that rarity increased their value. Reischek's time in New Zealand has been the subject of a biography by King (1981).

As early as 1878, Thomas Potts suggested setting aside Resolution Island to preserve the "peculiar form of life" in the colony. He expressed concern that,

> "It will not redound (sic) to our credit if we suffer the indigenous *fauna* to be exterminated without some efforts for its preservation. It is offered as a suggestion that considerable areas of land might be set aside and held under tapu to dog and gun"
> (Potts, 1882, 55)

In this same article, entitled National Domains, Potts also advocated sanatoria and forest conservancy. Interest lapsed until 1891, when, in response to discussion of a paper by James Richardson entitled, On the Extinction of the Native Birch of the West Coast and read before the Otago Institute, it was decided to ask the Government to "proclaim some suitable islands as reserves, in which the rarer species of New Zealand birds might be placed in safety" (Otago Institute Proceedings, 1891, 713).

Further support for proclaiming Little Barrier Island and Resolution Island as sanctuaries came in the form of a memorandum from the Governor-General, Lord Onslow, to the Premier (AJHR, 1892, H6). However, other events overtook Onslow's initiative: In 1891 Professor Thomas addressed the Australasian Association for the Advancement of Science on the "preservation of the native flora and fauna of New Zealand". Thomas advocated flora and fauna preservation, approved of the recent purchase of Little Barrier Island by the Lands Department, and suggested its dedication as a "Forest Reserve" as well as indicating the suitability of Resolution Island for similar purposes. He proposed two resolutions, which were carried unanimously and signalled a concerted entry by the scientific community in support of flora and fauna preservation. The resolutions read,

1. That in the interests of Science it is most desirable that some step should be taken to establish one or more Reserves where the native flora and fauna of New Zealand may be prevented from destruction

2. That the Little Barrier Island and Resolution Island, Dusky Sound, appear to be the most suitable localities for such Reserves.
(Thomas, 1891, 93)

Lord Onslow's memorandum and the Thomas resolutions were referred to Parliament in 1892 and 1893 respectively. However, by this time Resolution Island had already been gazetted as a fauna and flora reserve under the provisions of the Land Act, 1885. Fauna and flora preservation was not specifically designated under the conditions of the legislation, but were within the spirit of an Act, providing for the "growth and preservation of timber" and "natural curiosities of a character to be of natural interest". Thomas MacKenzie also raised the question of forest and bird protection in the House but to little effect. Land ownership questions delayed completion of the purchase of Little Barrier Island and frustrated its proclamation as a fauna and flora reserve. The matter was eventually forcible resolved with the passage of the Little Barrier Island Purchase Act, 1894. Hone Heke, the member for North Maori, vehemently asserted that this was yet another instance of Europeans arbitrarily acquiring Maori lands.

Several aspects of the scientific initiative require further investigation. The scientists of the 1890s were concerned with the preservation of the indigenous flora and fauna, but at the species level. It was proposed to transport species out of harms way to island sanctuaries. No concern was raised over the introduction of species onto island sanctuaries where they had not previously occurred. The concern was for species, not habitat; ecology was still a young science. Interestingly, the earliest case for reserves representative of typical flora of an area was made by a nature enthusiast, Harry Ell,

in 1903, and not a trained naturalist (Roche, 1981).

British naturalists of the nineteenth century recognized three measures to preserve flora and fauna. These were (1) by legislation, (2) by educational work and, (3) by nature reserves. Legislation was the favoured option as it combatted the major problems, in the British context, of cruelty and overcollection. Educational work in the longer term reinforced protective legislation, but "most commentators rejected nature reserves as ineffective and costly" (Sheail, 1974, 22) and at best a stop-gap measure. Legislation protecting species did occur in New Zealand. The Huia (Heteralocha acutirostris), for example, was protected by proclamation in 1892 (New Zealand Gazette, 1892, 18, 402). This measure proved ineffective and the species became extinct early in the twentieth century.

Cruelty and overcollection were not threats of paramount importance in the New Zealand context. Rather, the problem was how to retain examples of the indigenous flora and fauna when landscape transformation was occurring through widespread settlement. Island reserves seemed to offer the best means of acnieving this as they were physically separated from the landscape transformation produced by settlement. Legislation was ineffective, for, although species might enjoy protection, their habitats were radically transformed by settlement to the extent that they became unviable. Education provided no solution, for settlement goals synonymous with "progress" were axiomatic. Reserves offered the best alternative; they were also a particularly attractive option in New Zealand where many of the suitable sites were on Crown Lands, of limited value for settlement, and relatively simple to designate for special purposes. Long-settled countries with complex land ownership patterns and a small public domain could not create reserves so easily.

However, reserves once designated were too often left with no regard for the adverse effects of cattle, fire and wind. Critical observers such as the Reverend Walsh were rare:

> It is not merely sufficient to mark off so many blocks of land on the survey charts. They must be protected, and without delay, by something more substantial than an announcement in the Government Gazette
> (Walsh, 1892, 438)

The measures suggested by Walsh included barbed wire fences and a perimeter track around the reserve with rangers empowered to shoot trespassing animals and prosecute persons lighting fires or otherwise damaging the bush. However, little was achieved. Still, a beginning had been made, for flora and fauna reserves were now specifically identified as a distinct type of reserve under the Land Act, 1892. It was some time before administrators appreciated the difficulties of successfully preserving areas of indigenous flora and fauna.

In common with equivalent developments in forest preservation for aesthetic reasons, the 1890s emerge as a seminal period for scientific flora and fauna protection. This last decade of the nineteenth century was, in New Zealand, a period of social and political initiatives. It also marks the end of the pioneering phase; the "frontier" was closed and there was a time for taking stock after a half century of rapid and extensive environmental modification. Scientific understanding and appreciation of the unique qualities of the New Zealand flora was high and organizations such as the New Zealand Institute had sufficient mana to be treated seriously. Fortunately, the requests for flora and fauna reserves were sufficiently modest and not in conflict with settlement goals. Scientific arguments joined in the 1890s with other new aesthetic responses to the natural environment to produce new rationales for forest protection.

6.6 AESTHETIC APPEALS FOR FOREST PRESERVATION

The changes in taste whereby the natural world acquired "beauty" have been extensively explored (eg. Nicholson, 1958, Mainwaring, 1965). A perception of beauty in virgin nature changed the attitude towards wilderness from a profane to an edenic vision (Tuan, 1974). In New World enclaves of European settlement, recognition of beauty in nature was retarded by the demands of pioneer settlement (Lowenthal, 1962) and the unfamiliar attributes of the new environments (Shepard, 1969). Gradually, as the pioneering phase drew to a close and the New Zealand environment became more familiar and unmodified areas less abundant aesthetic sentiments were voiced in favour of forest reservation. The timing, the 1890s at the closing of "the frontier", marks the first flowering of an aesthetic concern for forest preservation both in New Zealand and the United States of America.

Many early travellers, for example Dieffenbach and Hochstetter, commented favourably on the scenery of the colony. Invariably they associated scenery with the forest. By the 1890s, pioneer settlement was ended and nearly 30 percent of the population was resident in urban areas; in excess of 10 000 people in 1891 with 45 percent in urban area of 1000 or more (Graham, 1981, 136). Landscape modification in the previous half century had also been extensive. In terms of forest area alone, settlement, accidental fires and milling had reduced the area from 40 000 000 acres in 1840 to 17 000 000 acres by 1909 (Ellis, 1923). While the goals of settlement and material progress were unchallenged, a few commentators believed that some areas of scenic beauty could and should be preserved. For example, the Reverend Rutherford Wardell in discussing the social responsibilities of a young colony claimed, with reference to the scenery of New Zealand that,

> "We make much of this, and rightly so. It is our best asset, even financially. It is quite singular in its variety. Within a few hours' travel you may pass through all the wonders and wealth of the five zones, and yet fire and axe are busy by river and lake, and hill and city, rendering forest and ferns to ashes"
> (Wardell, 1889, 20)

Wardell advocated Government intervention to prevent the destruction.

A similar response to deforestation is found in the poetry of William Pember Reeves, a leading figure for social reform in the Liberal Cabinet of the early 1890s. The last verse of Reeves' The Passing of the Forest, a lament for the children of Tane recapitulates the fate of the New Zealand forest:

> "The axe bites deep. The rushing fire streams bright;
> swift beautiful and fierce it speaks for Man,
> Nature's rough-handed foreman, keen to smite
> and mar the loveliness of the ages, scan
> the blackened forest ruined in a night,
> a Sylvan Parthernon that God will plan
> But builds not twice. Ah, bitter price to pay
> For Man's dominion - beauty swept away!"
> (Reeves, 1980, 382)

Reeves' poetry illustrates the New Zealand equivalent of North American events whereby "appreciation of wilderness led easily to sadness at its disappearance" (Nash, 1967, 96). It was a small step to move from that position to argue that areas should be legally protected for their scenic beauty. The mechanism to achieve this; the reserves system, already existed.

In 1891 the Taranaki Scenery Preservation Society was established. Its aims included the preservation of areas of indigenous bush, and scenic and historic sites. Over the following decade and a half, the society was instrumental in preserving ten pa sites and six blocks of forest country (Skinner, 1946, 90-92). Early efforts at scenery preservation were aided immeasurably by the characteristically inverse relationship between the location of areas of scenic value and the quality of these lands for settlement.

From the first, aesthetic considerations manifest in appeals for scenery preservations were usually mixed with remarks emphasising the economic contribution tourists made to the economy. Professor Kirk had used this approach in his 1886 report. Thomas MacKenzie proclaimed a similar marriage of the importance of scenery and the tourist industry before Parliament in 1891. On this occasion MacKenzie endeavoured to persuade the House of the benefits of opening up the Fiordland lakes to tourists. The proposal was regarded as both excessive and financially expensive. The House was called to order during the discussion of the motion which indicates the frailty of MacKenzie's position. However, from diverse quarters, sufficient impression had been made for provision for scenery reserves to be included under clause 235 of the Land Act, 1892.[7] Up to 1907, 254 scenery reserves, in total over 74 000 acres, were made under the Land Act, 1892 (Table 6.3). The provisions were used sparingly in the first years. Most of the reservations were made after 1898 in response to official Lands Department activity. The majority of the reserves were designated in connection with the Scenery Preservation Commission 1904-1906 (see section 6.7).

Following on from the provision for scenery reserves in 1892, the Lands Department began to introduce additional initiatives. In 1894 Percy Smith, the Surveyor General, advised the Commissioners of Crown Lands that due attention was to be given to reserving areas of historic interest, for indigenous flora and fauna preservation, and of places of

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7. A parallel movement occurred in the advocacy of an Arbor day by Alexander Bathgate, a Dunedin lawyer in 1891 (ODT, 1891, September 5, 12, 17). In his appeal for establishment of Arbor day Bathgate wandered indiscriminately through various arguments in favour of forests and tree planting. The first New Zealand Arbor day was celebrated in 1892. Henry Matthews, the Chief Forester, was of the opinion that the movement was not a great success (AJHR, 1903, C13A, 3). See also Chapter VII.

Table 6.3

SCENERY RESERVES GAZETTED UNDER THE LAND ACT,

1892-1907

Land District	Number of Reserves	Acreage	Mean Acreage
Auckland	19	4 889	257
Hawkes Bay	6	2 777	462
Taranaki	21	1 791	85
Wellington	97	4 463	46
Nelson	29	47 016	1 621
Marlborough	26	6 873	264
Westland	16	2 788	174
Canterbury	24	1 249	52
Otago	-	-	-
Southland	16	2 792	175
Totals	254	74 638	294

Source: AJHR, 1907, C6.

natural beauty as well as sowing plantations in areas of land unsuited to settlement but capable of growing trees (Surveyor General's Circulars 1894, No 267). In 1898 Percy Smith returned to the question of scenery preservation. Although primarily concerned with flood protection and conservation of water supplies, he advocated the reservation of forest on mountain ranges and along river banks, "not only in the interests of the conservation of their banks, but in the interests of tourists and other travellers" (Surveyor General's Circulars, 1898, No 3, 68). Both these examples indicate that the Lands Department recognized forest reserves fulfilled a number of utilitarian, aesthetic and "ecological" purposes.

A third Lands Department initiative stemmed from a resolution passed at the New Zealand Fruitgrowers and Horticulturalists' Dunedin conference of 1901. George Thomson, the seconder of Professor Thomas's 1891 motion in flora and fauna preservation, read a paper entitled The Stability of the New Zealand Flora: A Plea for its preservation. During the ensuing discussion, Leonard Cockayne, the eminent New Zealand botanist later instrumental in the securing of Arthurs Pass National Park (Harris, 1974), emphasised that,

> "The most valuable asset in our Colony was the scenery and if we destroyed our forests the scenery would be no longer an asset."
>
> (Cockayne, 1901, 112)

A motion deploring the unchecked destruction of the native flora and fauna was unanimously supported and the Government was urged to preserve "certain portions of the native forest of the colony" (Murphy, 1901, 115).

The request was directed to the Lands Department in 1902 and favourably regarded by J W Marchant, the Surveyor General who urged the Land Boards "to further this most laudable proposal" (AJHR, 1902, C1, x). He suggested five objectives:

1. the conservation of forest lands on watersheds to maintain water supplies

2. the conservation of forest lands to ensure the gradual distribution of rainfall, maintain climatic equilibrium and protect the native flora and fauna

3. to prevent degradation of high country and deposition on low lands

4. to conserve the scenic effect on low country by preserving the forest along river banks

5. to reserve all forest clad gorges and other places of natural beauty of interest to tourists.

This was not the first occasion on which Marchant had reacted favourably to suggestions for forest conservation. In 1881, when Chief Surveyor of Wellington Land District, he enunciated the same five arguments in response to the Surveyor General's Circular No 82 (see Chapter V) addressing forest conservation. He maintained his interest and prepared a comprehensive report in response to the Surveyor General's 1898 directive (Circular No 368). In 1902, from his position of Surveyor General, he was able to once again pursue forest conservation measures, only this time from a position of national authority. The results of Marchant's 1902 directive were summarized in a special report the following year (AJHR, 1903, C13, C13A, C13B). This report acknowledged a recent neglect of forests and reiterated forest conservation principles from a utilitarian and aesthetic perspective.

The report, foreshadowing later developments, also recommended the control of all State forests by three commissioners and scenery reserves by a board comprising the heads of the Tourist and Health Resorts Department, the Forest Branch of the Lands Department and the Commissioner of Crown Lands of the district in question.

Aesthetic concerns for forest conservation were assimilated into the forest management structure fairly swiftly after they were first enunciated in the late 1880s, through the addition of "scenery" to the

list of permissable reserve purposes. Acceptance in concept did not bestow any special rights and scenery reserves ranked behind other landuses. Fortunately, in many instances, sites of scenic value were on lands of limited potential for settlement. Scenic interest in the indigenous forests was heightened in 1903 and there soon followed a flurry of activity in the form of new legislation facilitating more widespread forest reservation for scenic purposes.

6.7 THE SCENERY PRESERVATION ACT, 1903

In 1903 Richard Seddon, the Prime Minister, introduced the Scenery Preservation Bill into the House of Representatives. As its title suggests, the bill was intended to facilitate the protection in perpetuity of lands of scenic and historic interest. This legislative initiative came about through the interaction of key government agencies and individuals, as well as changes in social attitudes towards the environment.

At this time the Lands Department displayed heightened interest in the protection of forest lands for flood protection and scenic purposes. This activity reached a peak with a review of existing and potential sites of scenic importance in 1903 (AJHR, 1903, C13, C13A, C13B). Lands Department officials were not alone in expressing an interest in scenery preservation. In 1902 Thomas Donne, Superintendent of the Tourist and Health Resorts Department, commented on the extent of forest destruction and urged Government action:

> "Vandalism has been responsible for past destruction and waste of some of New Zealand's most beautiful pieces of forest and in my opinion the preservation of scenic bush merits the most serious consideration of the Government"
>
> (AJHR, 1902, H2, 21)

Donne's 1903 report reiterated his concerns. Scenery as a tourist attraction, motivated the Tourist and Health Resorts Department's

interest. Meanwhile the Lands Department was preparing to expand its protection efforts in terms of the provisions contained in the Land Act, 1892.

The attitude of the administration produced conditions favourable for the success of a new initiative with respect to forest management. Strong, and on balance successful, advocacy for scenery preservation came from Harry Ell, Liberal MP for Christchurch South (Roche, 1979, Dingwall, 1981). Although in many respects Ell was ahead of public opinion, he was able to capitalise on the growing sympathies for the preservation of scenic and historic sites.

Ell displayed an intense interest in a diversity of subjects ranging from mental health, to single tax theories, old age pensions and the forty hour working week. However, his most original and enduring contribution was the Scenery Preservation Act, 1903. From 1900 Ell seized all opportunities to draw the question of forest conservation, in its widest possible meaning, to the attention in Parliament of the Minister of Lands. He also conducted an extensive and sustained correspondence with the Minister and officials of the Lands Department.

His many statements indicate the breadth of his interest in forests. He urged the gazetting of forest reserves to guard against flooding and conserve water supplies. He accepted that a "timber famine" was imminent and was critical of land "improvement" clauses which encouraged deforestation. On other occasions he spoke in favour of preserving forest lands for the protection of the indigenous flora and fauna. Some of his other proposals included indigenous afforestation, the setting aside of forest reserves as lands were opened for settlement, and a precocious expression of the concept of reserving representative examples of various forest types (Roche, 1981). These concerns may be grouped into the aeshetic, utilitarian and ecological

categories suggested by Nash (1967). However, this distinction may not necessarily have been apparent to Ell. On occasions he simultaneously embraced various viewpoints in arguing for forest conservation. For instance, he argued that forest reservation,

> "would add to the attractiveness of the country and in the mountainous districts would help to maintain the water supply for the lower levels of the country." (NZPD, 1903, 124, 142)

Seddon, when introducing the Scenery Preservation Bill to Parliament, laid stress on pragmatic considerations. Areas of scenic interest were typically of poor quality for agriculture. Thus scenery protection and settlement goals were not in direct conflict. Seddon also claimed that the bill would fulfil popular demands for the protection of scenic and historic sites for posterity. He outlined the means by which scenery preservation would be undertaken. A Royal Commission would be established to inspect and recommend suitable sites for reservation. The innovative aspect of the Bill allowed sites on freehold and Maori land to be scrutinised and, if of sufficient quality, to be taken and compensated under the Public Works Act. The Scenery reserves under the Land Act, 1892 were limited to Crown Lands. It was intended that the Commission would once and for all secure all the worthy scenic areas throughout the colony. The bill provided £100 000 to undertake the purchases. Once reserved, areas remained inalienable except upon the passage of a special act of Parliament. This type of provision had been discussed previously during the debate on the Tongariro National Park Bill in 1894 and was a reaction to the Government's lifting of State Forest reservations in the early 1890s.

Four arguments in support of the bill occur repeatedly. The one most frequently raised was a concern to preserve some of the natural beauty of the country for future generations. Two related supporting arguments concerned the perceived quality of the scenery of New Zealand

and the potential for it to serve as a tourist attraction. The fourth argument was a pragmatic one, that the lands in question were of no use for settlement so that reservation for scenery protection was to put them to their "best use."

Several parliamentarians agreed in principle; others raised concerns about various aspects of the bill. William Massey, leader of the opposition, was not alone in his criticism of the expense of maintaining a Royal Commission to inspect potential sites throughout the colony. Other members spoke, reiterating old arguments about the difficulty of preserving bush reserves, on the requirements of Lands for settlement and of yet another invasion of Maori land.

Attention was focussed primarily upon acquisition of suitable areas. The difficulties of preserving sites into the future were raised by opponents, but minimised by advocates. In this respect the proponents of scenery preservation were failing or refusing to recognize real difficulties which had been identified by contemporary observers (eg. Walsh, 1892, 1898, 1910). The bill was passed into law, but not before both Seddon and Joseph Ward, the Colonial Treasurer, paid tribute to Ell's role. Seddon complimented Ell on,

> "his persistence in claiming that something should be done, and I hope he will give me credit for keeping faith and having carried out what I promised him should be done, and on the exact lines put forward by the last deputation that waited on me in Christchurch"
> (NZPD, 1903, 126, 704)

The initiative rested with Ell, but the attitude of the Lands and Tourist and Health Resorts Department was conclusive to such a move. The wider social attitudes towards nature were also important, and Ell himself was at least in part a product of the reappraisal of the natural environment of the colony in the 1890s.

The Scenery Preservation Commission was appointed in 1904. It consisted of Stephenson Percy Smith a former Surveyor General and noted

ethnologist, J W Marchant the Surveyor General who had displayed sympathies toward forest conservation as early as 1881, Henry Matthews the Chief Forester, W W Smith a naturalist and former curator of the Ashburton Domain and Major Hoani Tunuiarangi. The Commissioners operated under the auspices of the Tourist and Health Resort Department. They toured the country inspecting sites and received submissions from Parliamentarians and private citizens drawing their attention to other localities.

In all 383 areas, approximately evenly divided between Crown, freehold and Maori lands were drawn to the Commissioners' attention (SPC Recommendations 1904-1906, LS 70/5) before it was replaced by a more streamlined board system in 1907. Forested sites dominated the recommended sites and the eventual scenic reserves (Table 6.4). The longterm effect of the identification of scenery with sylvan vistas has produced an imbalance in reserve types in favour of upland forest sites (Roche, 1981). By 1907, 88 scenic reserves in total 25 801 acres had been gazetted.

The Scenery Preservation Act and its attendant Commission was the first instance of special purpose legislation designed to preserve areas of scenic and historic importance. National Parks have been deliberately excluded from this discussion for, although they share common roots in aesthetic considerations of landscapes, their development has been as exceptional events and their raison d'etre related to recreational pursuits rather than forest protection.

Wynn's judgement of Vogel and the New Zealand Forests Act, 1874, that,

> "the combination of character and circumstances, yield, in the context of time and place, a singular outcome"
> (Wynn, 1979, 185)

is equally applicable to the Scenery Preservation Act, 1903. The

Table 6.4

LANDSCAPE PREFERENCES OF THE SCENERY PRESERVATION COMMISSION

Type	Number	Percent
Natural Curiosities	27	7.8
Historic	49	14.2
Scenic Bush	125	36.2
Bush and Inland Waters	90	26.1
Coastal Features	54	15.7
	344	100

Source: Roche, 1981, 74.

Lands and Tourist and Health Resorts Department were receptive to new developments. The wide social attitudes to the natural environment were also in flux. In this atmosphere Ell, through vision allied with persistence, was able to achieve the institutionalization of forest preservation for aesthetic reasons.

6.8 CONCLUSION

The 1890s were a critical watershed of sweeping political initiatives in New Zealand. Against this backdrop of progressive social legislation, the Liberal government also accepted scientific and aesthetic arguments for forest protection. These were institutionalised in the Land Act, 1892. This was a concession on the part of the Government, for land settlement was central to the Liberal platform.

The official, scientific and popular appraisals of forests that existed in the 1890s were generally dynamic although they contained some persistent elements. The dynamism stemmed from new scientific and aesthetic appraisals. By this time the displacement concept had faded (see Kirk, 1895). The interpretation of other environmental variables had also changed; the forest influence concept had shifted in emphasis from rainfall being attracted to forests to forest cover as a means of flood protection. This latter idea had been referred to by Marsh (1864), but received new emphasis in the 1890s.

In what was a fairly fluid relationship, the balance between each of the appraisals in terms of their importance to the Government also changed. This was notable in the improved standing of scientific arguments for forest protection typically presented in the form of resolutions. Ideas and beliefs about forests were the product of individuals, sometimes conspicuously focussed around key events and located within a wider social and political setting. The relative

claims of individuals, key events, and the wider social and political setting are of considerable importance in any attempt to understand the past. Exclusive focus on any one of these aspects invites insularity and distortion.

Using the arguments supporting flora and fauna preservation as an example, the important individuals that emerge are Thomas Potts and Professor Kirk, both of whom had a multifaceted involvement with forest management in New Zealand. What was the key event? As far as any single event was of exemplorary importance, the resolutions passed by the Australasian Association for the Advancement of Science in 1891 are a likely choice of an instance where scientific opinion was mobilised to urge forest preservation. However, this meeting provided "a" venue but not the sole opportunity; consider, for example, the 1901 motions consequential to Thomson's conference paper. Perhaps the important aspect of key events is that they may present an opportunity, to be taken or lost.

The importance of background events must not be neglected either, for in some instances they contribute significantly to the process by which any leading advocate comes to develop his or her views. By the 1890s the collection and description of New Zealand's flora and fauna was comparatively well advanced. Early visitors from Cook onwards collected a wide range of specimens. Substantial works on the flora and fauna appeared in the second half of the nineteenth century (eg. Hooker's Flora, 1864, Kirk's Forest Flora, 1889, and Buller (1871) and Hutton's (1872) ornithological works). The native flora and fauna was described; its endemism was recognized and prized by some scientists. Developing on from the collection and description phase, attention turned progressively towards seeking the preservation of examples of the indigenous flora and fauna. Other circumstances lent urgency

to this design, for land settlement had already resulted in the extinction of numbers of the indigenous avifauna (Pears, 1982). The rate of environmental change was perceptible, especially if forest cover was used as an index. These circumstances provided scientists with the incentive to commend the reservation of forest to Lands Department administrators. The perceived nature of the threat to the indigenous flora and fauna also influenced the favoured protection measures. Reserves on offshore islands were adjudged to offer the best means of preserving the indigenous species. Legislation and education, appropriate counter measures in Britain were ill-suited to the New Zealand context, where the major problem was not cruelty, but threatened extinction.

Arguments emphasising aesthetic considerations as a reason for preserving the forest may also be interpreted in terms of prominent advocates, key events, and background circumstances. Thomas MacKenzie emerges as the parliamentary advocate of this persuasion, but his arguments occasionally treated rather lightly by the House of Representatives. The less conspicuous but highly influential role played by J. W. Marchant as Surveyor General, a long time advocate of a wide range of forest conservation measures dating from 1881, was doubtless of greater importance. The key events as far as scenic arguments for forest protection were concerned are Marchant's circulars of 1902 in response to the Fruitgrowers and Horticulturalists Conference. This directive to the Commissioners of Crown Lands consolidated the Lands Department's position on forest protection and provided a sympathetic environment in which Harry Ell could direct greater attention towards forest conservation in its broadest sense. Forest reservation throughout the first decade of the twentieth century has remained inextricably associated with Harry Ell. It is probably acceptable to argue that Ell

was unique and that no one else could have replaced him and retained equivalent impact.

The interest of Ell and Marchant did not evolve in isolation. The passing of the pioneer phase of development was marked by increasing urban growth and closer settlement of rural lands. Landscape change was reaching a peak, in terms of rates of deforestation at least, at a time when Europeans had adjusted to, and could identify with, the special character of the New Zealand environment: it was no longer perceived to contain the unfamiliar elements of fifty years earlier. A new appreciation of the indigenous flora coupled with its increasing scarcity gave rise to scenery preservation in the 1890s. The timing of this reappraisal matches that of aesthetic interest in forests in Australia and the United States.

The achievement of the 1890s and early 1900s was the development and incorporation of new aesthetic and scientific arguments for forest preservation into the existing framework of forest management. Ultimately, scenery preservation attained its own special purpose legislation. Throughout, attention was focussed on the acquisition of lands, while little attention was given to the maintenance of gazetted areas, whether they were for protection, scientific or scenic purposes. Caretakers appointed to some flora and fauna reserves were only a partial exception. In part this stemmed from a lack of appreciation of the difficulties of perpetuating areas of natural forest. Some advocates entirely overlooked, or would not acknowledge, the existence of these difficulties. Protection forests continued to be gazetted but other forest lands were returned to settlement at a greater rate. Official involvement with production forestry, apart from the Timber Conference and establishment of a Forestry Branch of the Lands Department to undertake exotic afforestation, remained minimal, albeit, that

a valuable stocktaking exercise was undertaken by Marchant, the Surveyor General in 1902-03. Production forestry was, however, the facet of forest management that received the most attention in New Zealand in the years 1909 to 1919.

CHAPTER VII

RESPONSES TO A TIMBER FAMINE: THE ORIGINS OF THE STATE FOREST SERVICE

7.1 INTRODUCTION

"The forest question is the most important social question now before the country", claimed David Hutchins, the eminent British forester, who came to New Zealand from Australia in 1915 (Hutchins, 1916a, 295). This was the extravagant claim of a forestry advocate, but, by the second decade of the twentieth century, agitation for the establishment of an independent state forest department was again on the ascendency. Interest in an expansion of the forest lands under the Scenery Preservation Act continued (Roche, 1979). However, most attention, spurred by war time constraints, was focussed upon production forest management. Since the mid 1890s, exotic plantations were the official and popular answer to timber supply problems. The narrow equating of forestry with tree planting commented upon by Campbell Walker in the 1870s persisted. However, forceful presentation of indigenous forestry by Hutchins caused a reorientation of official policy by 1919.

This chapter provides an opportunity to examine the origins of the State Forest Service in more than the abbreviated detail standard accounts contain (Allsop, 1969, Poole, 1969, Simpson, 1973). At the conceptual level this episode, and a wider examination of its context, again raises questions about the relative importance of individuals, key events and the wider social and political environment, as touched upon in previous chapters. Of related interest was the fashion in which scientific forestry influenced the politicians to replace tree planting, by a more sophisticated forest management and the formation of an interest group, the New Zealand Forestry League, to pressurise

and propogandise the case for State Forestry.

Some issues persisted from earlier times. These included the ever impending "timber famine", which caused unprecedented concern in the early twentieth century, arguments about the respective merits of forest uses and land settlement, and the advantages of exotic afforestation over indigenous regeneration. The single most important new dimension was contributed by the scientific community, who produced evidence about the growth rate of indigenous species. This had considerable bearing on whether afforestation or regeneration was to be accepted as the most advantageous management strategy.

Both the timber famine, with its associated exotic afforestation issues, and the rise of scientific forestry had parallel counterparts in North America. The insights of Olson (1971) into these questions provides an interpretative springboard into the New Zealand context. This chapter discusses the forest lands and settlement issue as a contributor to a timber famine and as a source of resistence to organised State Forestry. Contemporary conceptions of the timber famine are then examined in more detail. The official solution to inadequate timber supplies, state afforestation, is then considered. The slow growth of indigenous forests was frequently cited in support of exotic afforestation, but this idea was gradually revised to offer new possibilities for indigenous management. A corollary to successful indigenous management was the creation of a State Forest Department. The progress towards this end, and various influences upon the course of events, are discussed in a final section.

7.2 FOREST LANDS AND SETTLEMENT

Continuing pressure on lands for agriculture led frequently after 1908, as in the preceeding two decades, to parliamentary motions to

revoke State Forest lands and turn them over to settlement (Figure 7.1). The means of assessing land capability developed in sophistication to include the market value of the land, altitude, forest type and worth, suitability for settlement, water conservation value and accessibility. Even so, it was still a fairly straightforward appraisal geared towards evaluating settlement rather than forestry potential. The numbers of motions to revoke State Forests remained high, albeit intermittent until the outbreak of World War One when a substantial reduction occurred. Four Land Districts accounted for all of the lands redesignated for settlement purposes with the majority being located in Southland (Figure 7.2).

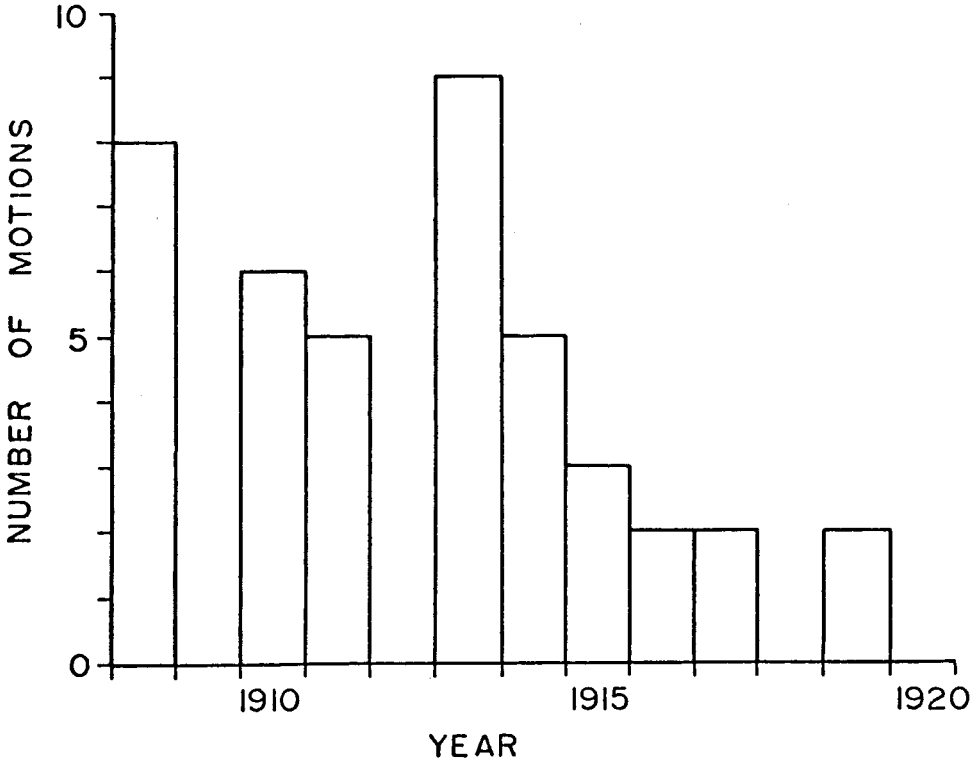
The revocation of State Forest lands, allowing them to be thrown open to settlement, did not go unchallenged in Parliament. Harry Ell, architect of the Scenery Preservation Act, 1903 and self appointed spokesman on forest matters continually cautioned the Government against too readily revoking State Forest Lands:

> "They all knew pressure was brought upon every Prime Minister for the opening-up of lands by people who had, for the most part no regard for the country. They were eager to hew the forest down and get hold of a piece of land and wait for a rise in the price of land to dispose of it."
>
> (NZPD, 1913, 163, 607)

It is interesting to note that Ell did not directly criticise settlement, but blamed speculators - the enemy of the small man, for the difficulties. The land settlement ethos remained paramount. In characteristic fashion, Ell did not concern himself solely with fighting a rearguard action to protect the remaining forest reserves, but argued that small forested areas should be set aside as new lands were opened for settlement. By these means he hoped to incorporate provision for forest reserves into the usual Lands Department procedure for opening new lands for settlement.

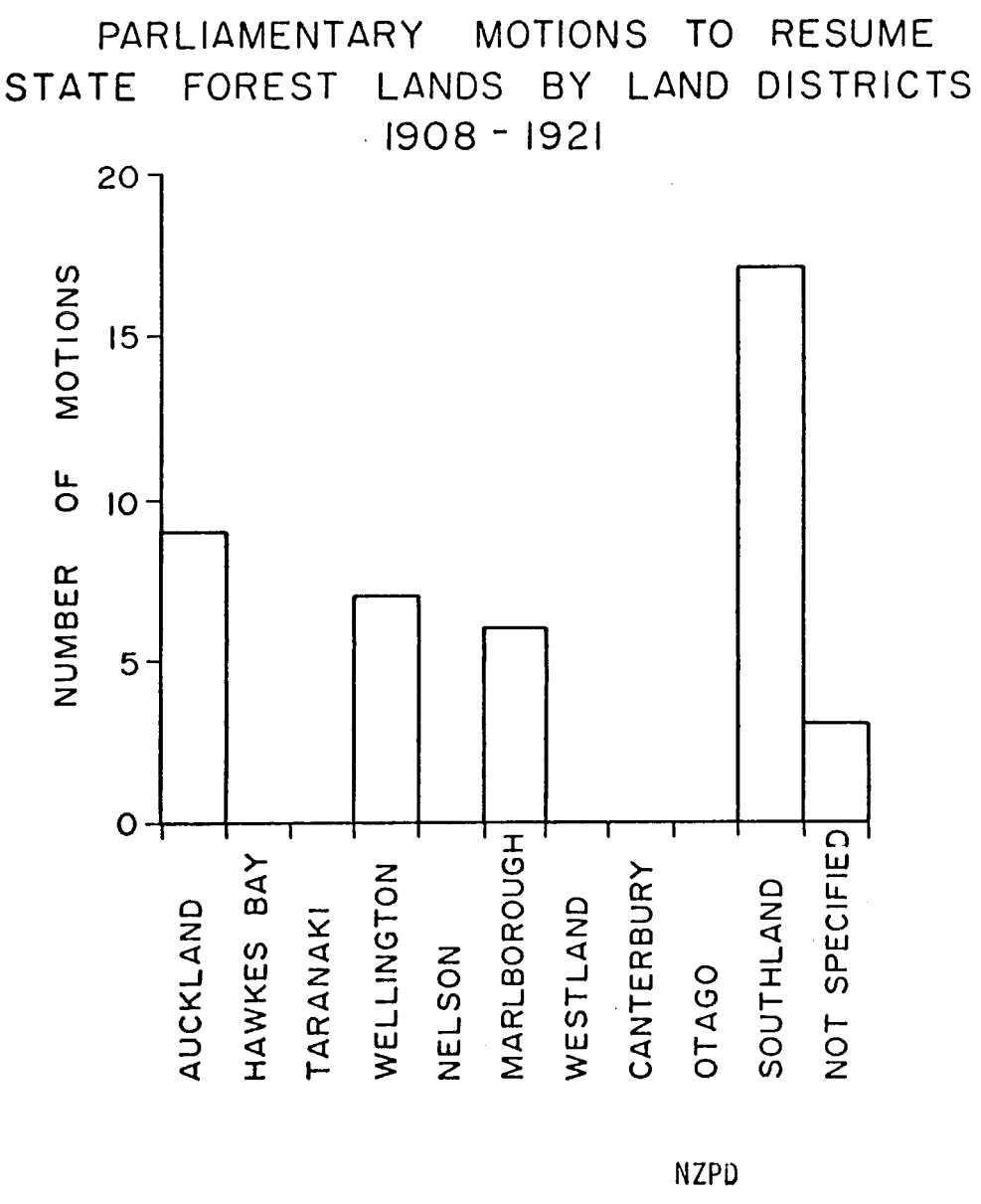
Figure 7.1

PARLIAMENTARY MOTIONS TO RESUME STATE FOREST LANDS 1908 - 1921



NZPD

Figure 7.2


PARLIAMENTARY MOTIONS TO RESUME
STATE FOREST LANDS BY LAND DISTRICTS
1908 - 1921
NUMBER OF MOTIONS
20
15
10
5
0
AUCKLAND
HAWKES BAY
TARANAKI
WELLINGTON
NELSON
MARLBOROUGH
WESTLAND
CANTERBURY
OTAGO
SOUTHLAND
NOT SPECIFIED
NZPD

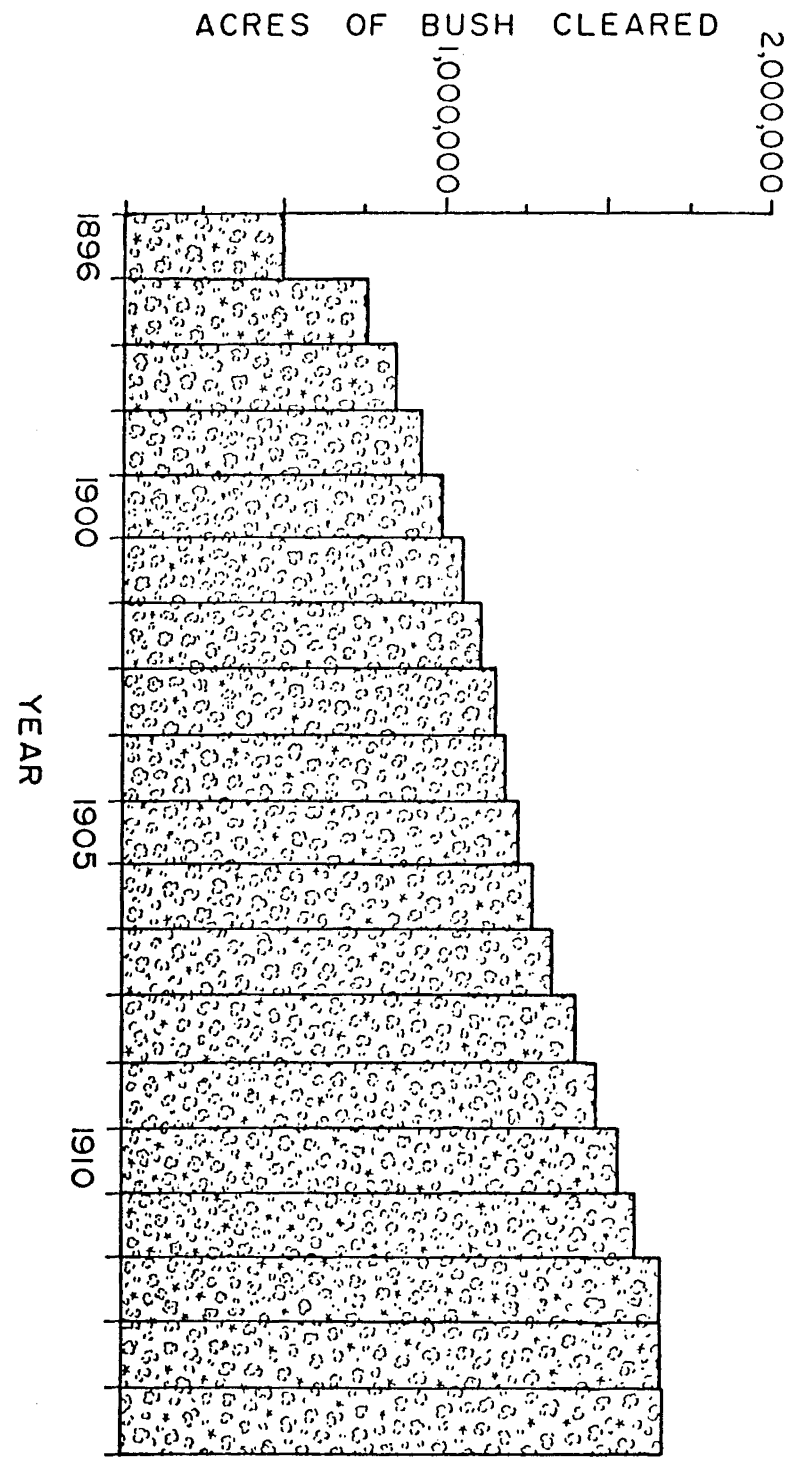
The provisions of the Land Act, which required settlers to clear a proportion of forest from their lands annually, continued to take its toll of the forest lands (Figure 7.3). Bush clearance from former Crown Lands peaked at over 20 000 acres in 1897. Smaller peaks, in excess of 10 000 acres, occurred from 1902-03 and 1906-10. The overall pattern of bush clearance from 1896-1914 is depicted in Figure 7.4. This includes forest cleared from Crown Lands in years after it was initially taken up, and shows a steady increase from 500 000 acres to one and 1 500 000 acres in nineteen years.

The returned soldier settlement schemes which made undeveloped land readily available to former servicemen further exacerbated the situation as increasingly marginal country was taken up. Ell described timber as the "best crop" which these lands could grow. The loss of forest through land clearance for settlement and accidental fires, combined with aggravated floods and soil erosion, provided one dimension of renewed calls for forest management:

> "In every new country the first business is to clear the forest, and open up the best land for farming and settlement; but if that clearing goes too far, it deprives the settlers of their supplies of timber and firewood, and raises the cost of living."
>
> "What the country has now before it - and it is really an urgent war measure - is the demarcation of the forests, and the formation of a Forests Department to manage the demarcated forests."
>
> (Anon, 1919, 58)

7.3 THE TIMBER FAMINE 1905-1919

Forest clearance and the resumption of State Forests for settlement were not the only sources of resource depletion. Losses due to fire were also important, as was the impact of the timber industry itself upon the remaining forest lands. Changing spatial and temporal patterns in the timber industry are reflected in the contemporary census



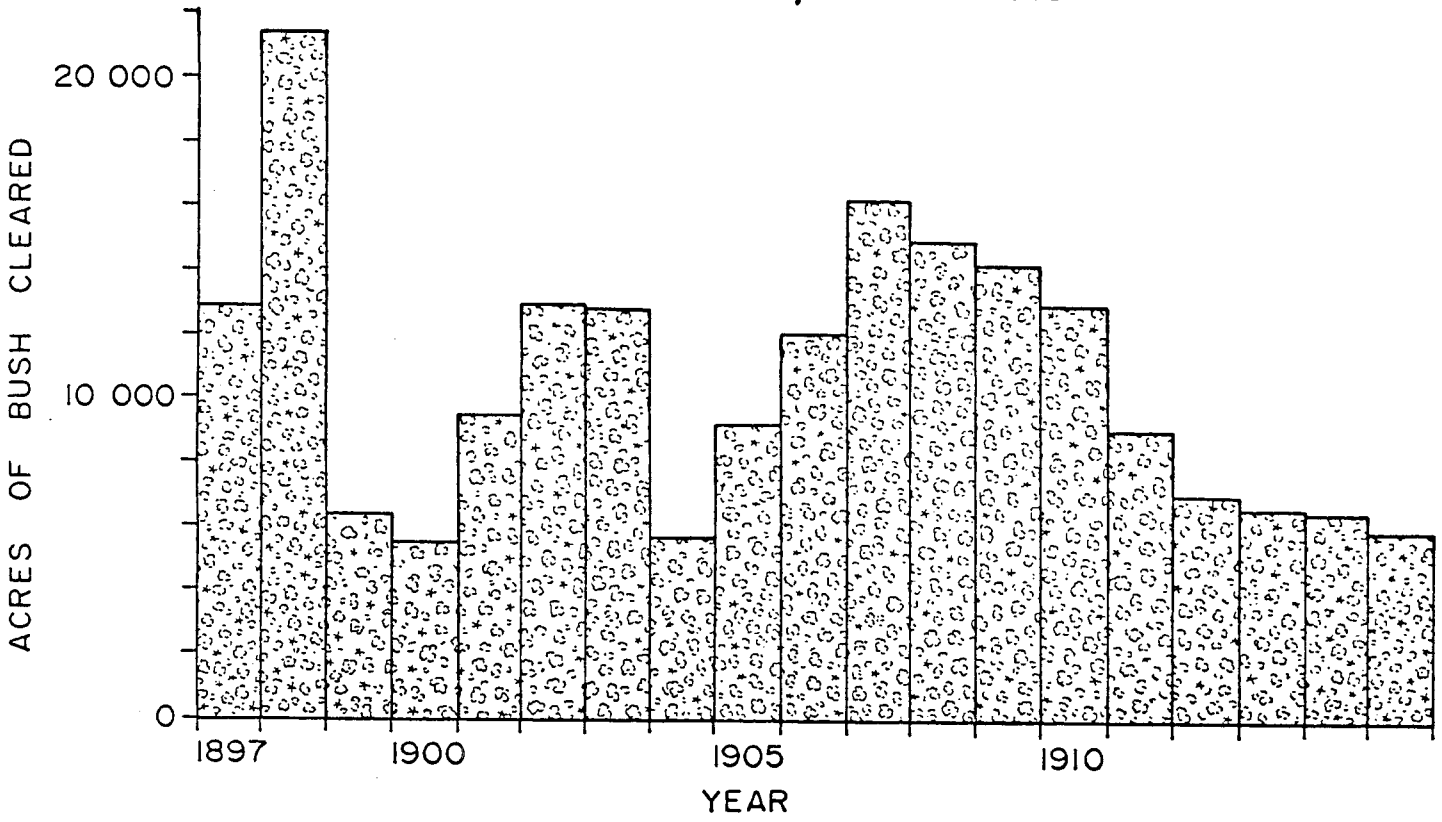
BUSH CLEARANCE FROM CROWN LANDS, 1896 - 1914

Figure 7.3

AJHR, C1

Figure 7.4

BUSH CLEARED FROM CROWN LANDS TAKEN UP IN THE PREVIOUS YEAR, 1897 - 1915



AJHR, C1

data (Figure 7.5). Unfortunately, this data incorporates sash and door factories with sawmills and this inflates the number and distorts the pattern. Generally however, Auckland, Otago-Southland, Wellington and Nelson emerge as the regions where sawmilling (and downstream woodworking industries) remained prominent. The general temporal trend, with the exception of Nelson, was one of gradual rise, peaking around 1906-1911 and then declining. The production of sawn timber followed a similar pattern (Table 7.1). However, the quantities of sawn timber are smaller than estimates for the total production of the timber industry. In 1905 for example, total output was estimated at 413 289 742 superficial feet, nearly a quarter more than the 1906 output of sawn timber.

Special reports on forestry in the Appendices to the Journals of the House of Representatives in 1905, 1907, and 1909, as well as the Timber Commission of 1909 and the Royal Commission on Forestry of 1913, stand as testimony to growing concern that a timber famine would inevitably occur. Given more comprehensive, although not necessarily accurate, information about the remaining quantity of millable timber and current rates of extraction, Government officials got about estimating the length of time before the indigenous forests became exhausted. This was most often done by simply dividing the quantity of millable timber by the annual sawn output. In some cases adjustments were made for inaccessible areas and likely increases in future production. Although, like Kirk's 1886 computation, these were fairly crude calculations, they were the first attempts at empirical estimates. In 1905 it was suggested that the total forest resource, Crown, freehold and Maori, would sustain the timber industry for another 70 years (Table 7.2). Over the next four years this estimate was successively reduced to 35-40 years which placed forest exhaustion some time before the mid

Figure 7.5

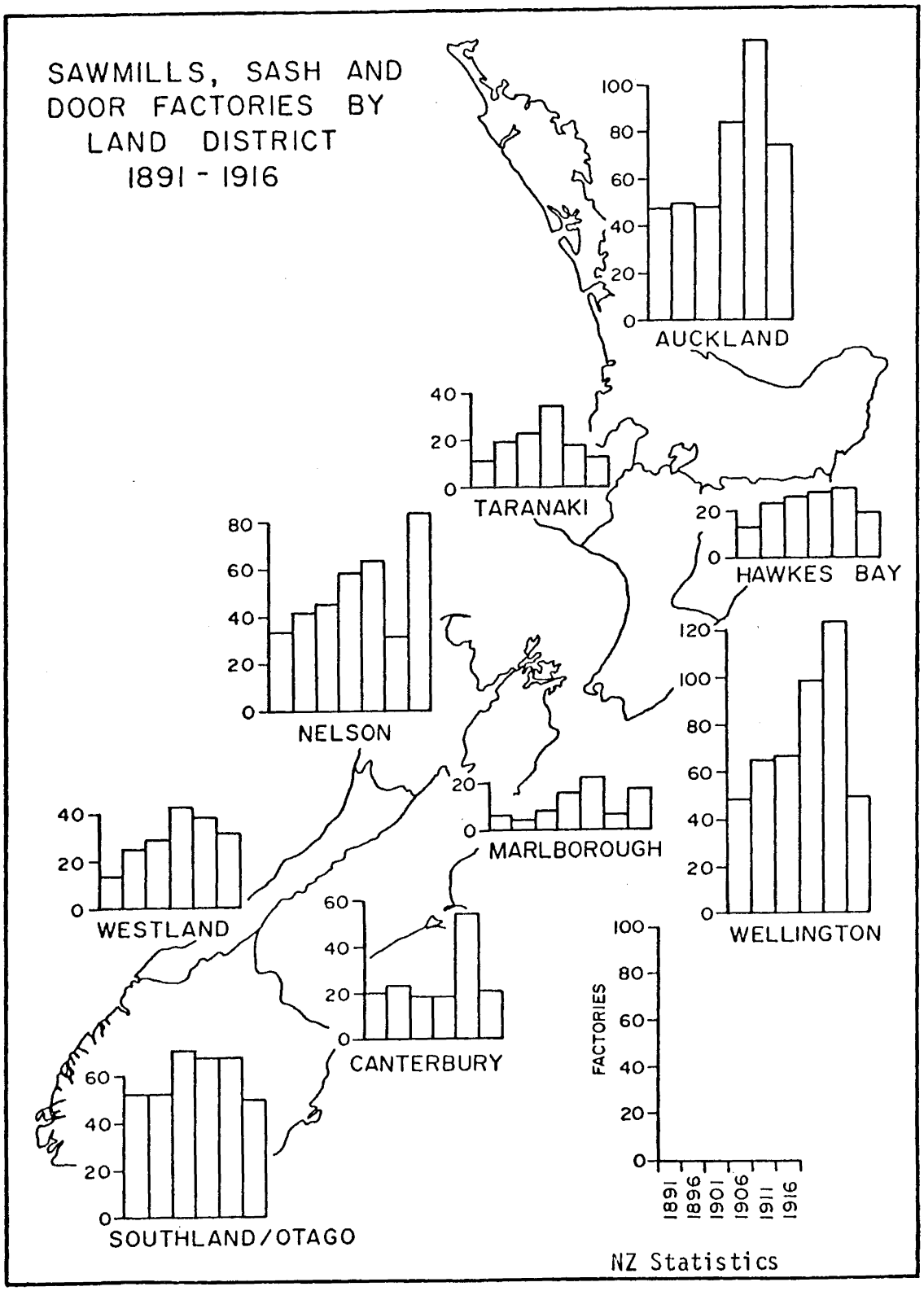

SAWMILLS, SASH AND DOOR FACTORIES BY LAND DISTRICT 1891 - 1916
AUCKLAND
TARANAKI
HAWKES BAY
NELSON
MARLBOROUGH
WELLINGTON
WESTLAND
CANTERBURY
SOUTHLAND/OTAGO
FACTORIES
1891
1896
1901
1906
1911
1916
NZ Statistics

Table 7.1

PRODUCTION OF SAWN TIMBER IN NEW ZEALAND

1891-1916

Year	Quantity Sawn (superficial feet)	Value (£)
1891	162 116 221	566 335
1896	191 053 466	627 959
1901	261 583 518	971 048
1906	336 470 930	1 442 950
1911	296 033 017	1 725 827
1916	251 097 312	1 330 831

Source: New Zealand Statistics 1891-1916

Table 7.2

OFFICIAL ESTIMATES OF TIMBER SUPPLIES

Year	Estimated Quantity Crown, Freehold and Maori Lands (Superficial feet)	Length of Timber Supplies (Years)	Approximate Expiry Date
1905	43 000 000 000	70	1975
1907	36 685 664 476[1.]	less than 70	pre 1975
1908	36 000 000 000[2.]	50	1958
1909	35 101 699 757[3.]	35-40[4]	1945-49

Notes

1. Recalculated by Simpson (1973) pp 274-275
2. Approximated from 1907 estimates
3. Millable forest estimated at 17 074 003 acres
4. Reiterated in 1911 see AJHR 1911 C1B

Source: AJHR 1905, C6, 1909, C4, 1909, C4.

twentieth century, coincident with a hundred years of large scale European occupancy. The decline in sawmill numbers, the reduction of output, unused plant capability (Table 7.3) and the reworking of cut over areas points to a real decline and possibility of impending shortage. If existing trends continued it was considered that New Zealand would become dependent upon timber imports and face increased internal costs.

Predictions about a coming timber famine had existed since the late 1870s. By the first decade of the twentieth century, following a period of extensive deforestation for land settlement, increasing per capita timber consumption, and with the first concrete assessments of the limits of the forest resource, a timber famine seemed likely within a generation. This predicament was not unique to New Zealand; indeed Europe, North America and Australia all faced similar difficulties.

Olson (1971) has examined the complexities of the North American timber famine in a fashion which offers some insights into equivalent events in New Zealand. She suggested public concern about the destruction of North American forests developed into "a powerful emotive issue" (Olson, 1971, 30) in the early twentieth century through four converging factors. The first of these was the speed of cutting in the 1850s.[1] Second was the European experience, from John Evelyn's Silva of 1664 through to resource depletion felt in the aftermath of the industrial revolution - was this to be North America's fate? Thirdly, there was the consumer exposure to shortages felt during the

---

1. Williams (1982) further highlights the importance of the first half of the nineteenth century to subsequent forest conservation efforts.

Table 7.3

SAWMILL DISTRIBUTION, CAPACITY AND OUTPUT

1907

Land District	Number of Mills	Total Annual Cutting Capacity (superficial feet)	Total Output 1907 (superficial feet)	Output as a percentage of plant capacity
Auckland	59	256 325 000	190 543 000	74
Hawkes Bay	38	70 804 000	40 868 118	77
Taranaki	29	32 158 000	16 824 281	52
Wellington	83	118 440 000	70 108 000	59
Marlborough	14	15 770 000	9 689 000	61
Nelson	71	61 127 000	16 594 399	27
Westland	49	94 526 000	44 933 813	48
Canterbury	9	3 000 000	1 164 000	39
Otago	9	5 690 000	3 190 000	56
Southland	50	61 100 000	38 087 000	62
Totals	411	718 940 000	432 031 611	60

Source: AJHR, 1907, C4

American civil war and, finally, the prairie experience, which was a combination of a romantic concern for wilderness and the special problems of grassland ecosystems where drought was frequently attributed to treelessness.

These four factors in combination led to a timber famine, but also provided an idealized solution in the form of sylviculture, "the scientific growing of timber as a crop" (Olson, 1971, 3). However, Olson's major thesis, thoroughly illustrated with examples from railroad companies, is that the adjustment to deforestation was neither as painful nor abrupt as contemporaries predicted, nor did it take the idealized form of a sylvicultural solution. Rather, she argues in favour of "a significant behavioural response ... by major industrial consumers of wood, not by forest owners, managers, or timber producers" (Olson, 1971, 3).

The general headings employed by Olson to describe the varied causes of a timber famine in North America provide guidelines to understanding timber supply problems in New Zealand. The rate and extent of deforestation was often remarked upon in the nineteenth century,[2] but never more so than in the decade 1890-1900 when wanton destruction of forests and losses through accidental fires were overshadowed by extensive land settlement schemes and 9 000 000 acres of bush were cleared (Cumberland, 1941).

European experience of resource depletion was a less certain influence on the remote New Zealand environment where forests were typically regarded as an abundant obstacle to settlement. The antipodean flora and fauna were distinguishable from those of Europe. Settlers of the new land soon preferred to believe that European experience was

---

2. Many saw this in a positive light as an indication that land was being put to better use; settlement.

not applicable to the solution of antipodean problems. It was not until the 1860s and 1870s that a few New Zealand observers, drawing on the examples of writers such as Marsh, reinterpreted the depletion of forest resources as an adverse development. In contrast to North America, links between New Zealand and forestry developments in Europe and the British Empire remained tenuous throughout the nineteenth century and thus did not serve as a powerful model for future timber supply problems.

In New Zealand, the first large-scale consumer experience of timber shortages accompanied the fall in production during World War One. In 1906, 336 470 930 superficial feet of timber were produced by 444 mills, but by 1916 this had been reduced by wartime labour shortages to 251 097 312 superficial feet from 292 mills.

The New Zealand equivalent of Olson's "prairie experience" occurred on the tussock grassland plains of Canterbury and Otago. In this environment some local shortages of timber had been felt. From the beginnings of settlement farmers had speedy recourse to afforestation. They also perpetuated the forests and rainfall idea and in the case of Alexander Bathgate, a Dunedin lawyer, ventured so far as to urge in 1891 the adoption of an Arbor day.

In New Zealand each of these four factors had a differential impact over time and space. Some contemporary observers considered over cutting of forest resources was occurring in the late 1860s. Deforestation continued unabated however, and probably did not reach its peak until the last decade of the nineteenth century. The "plains experience" also dates from the 1860s and 1870s and was essentially restricted to the South Island, just as widespread deforestation for land settlement was characteristically a North blend phenomenon. However, for much of the nineteenth century the South Island was politically and

economically in the ascendancy, and the plains experience provided an early solution to timber supply problems. European developments were spasmodically referred to as a model for forest management in New Zealand, but never with enduring success. Not until the second decade of the twentieth century, chiefly through their presence, were professionally trained foresters able to influence forest management. Over-clearing was the chief cause of timber supply problems in New Zealand, although the shortages that occurred during World War One acted as a trigger factor in moving toward scientific forest management.

The idealized solution to timber famine problems in New Zealand took the form of exotic afforestation. This can be largely, although not entirely, explained as an outcome of the treeplanting activities on the open plains of the South Island. On the whole, scientific forestry stressing sustained yield management of indigenous forests was not understood, which tended to limit solutions to treeplanting for ensuring supplies. Against this, the displacement concept, which stated that the indigenous flora and fauna were giving way to stronger invading species (see Chapter III) and a concern about the growth rate of indigenous forest trees (see section 7.5), mitigated against persisting with attempts to perpetuate indigenous forests. Further experimentation had shown that a wide range of exotic forest trees grew easily and quickly in the New Zealand environment. Thus, when the identification of a timber famine became more widespread in the late nineteenth and early twentieth centuries, the popular and official response was to encourage afforestation activities. A Forestry Branch of the Lands Department was established to undertake this work in 1896 (see section 7.4), but the presence of professional foresters during and after World War One was sufficient to reorient official forest policy towards indigenous sustained yield management (see section 7.6).

7.4 STATE AFFORESTATION 1896-1919

Afforestation was favoured in popular and official circles as a solution to the problems of timber famine in New Zealand. This idea was not new, and had proponents in the 1870s (see Chapter III). Private afforestation efforts (Barnett, 1946, Hart, 1966), government encouragement schemes, such as the Forest Trees Planting Encouragement Act, 1871 and later plantation boards (Cooney, 1949), were all initiated in the nineteenth century. By 1891 nearly 40 000 acres of private plantation existed; this nearly doubled over the next twenty five years (Figure 7.6). These efforts were concentrated in Canterbury (24 030 acres in 1916), where many of the plantings were for shelter belts, and Auckland (15 008 acres in 1916) with in excess of 6000 acres established in Hawkes Bay and Wellington Land Districts (Figure 7.7).

Official concern over the timber famine led to more direct State involvement in afforestation efforts. One tangible sequel to the Timber Conference of 1896 (AJHR, H24, 1896, see Chapter VI) was the creation of a Forestry Branch of the Lands Department and the appointment of Henry Matthews as Chief Forester. The title "Forestry Branch" was something of a misnomer as afforestation work was the dominant activity of the sub department. This does, however, convey the limited official and popular attitude towards the scope of forestry activity.

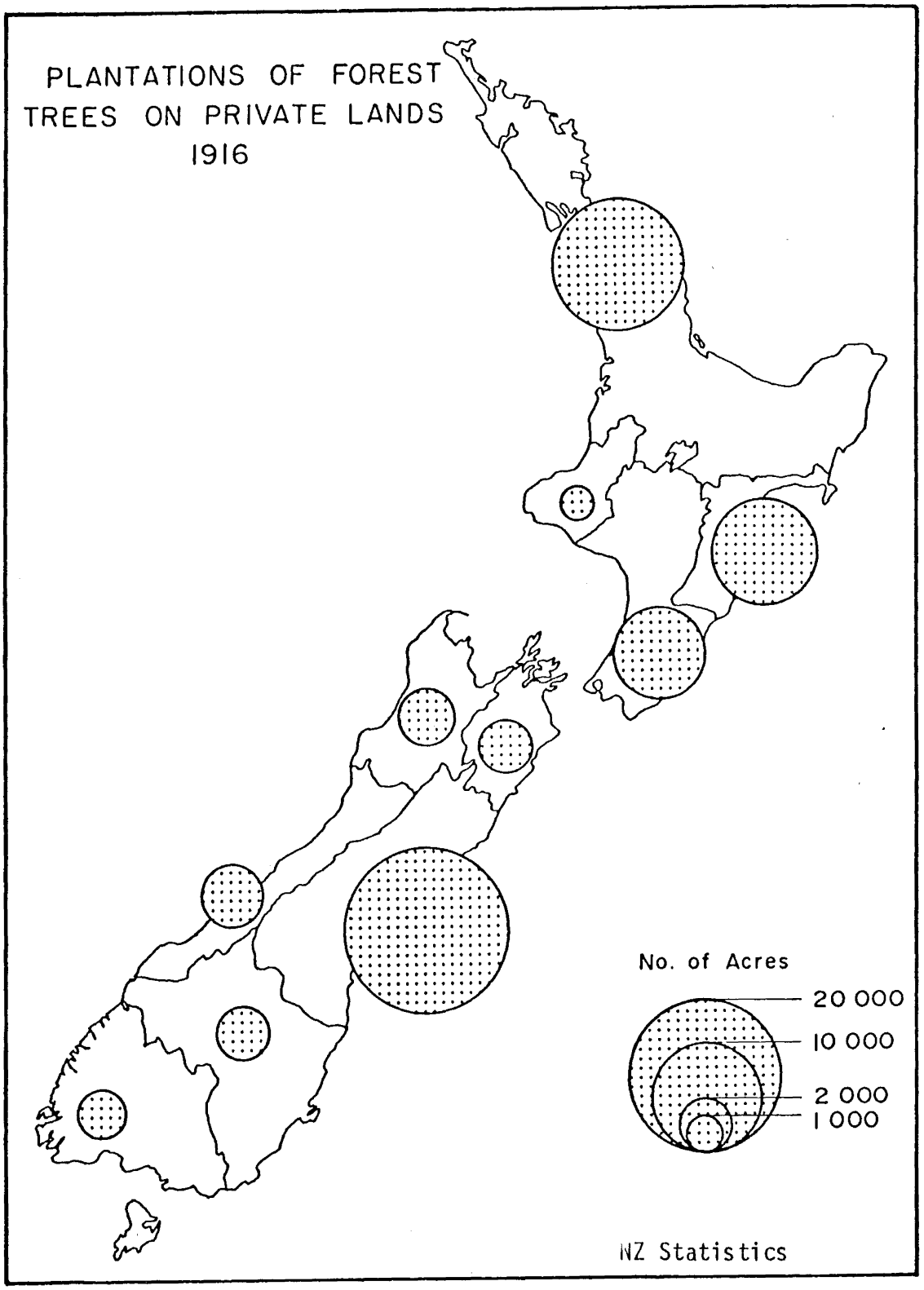
Government afforestation policy in 1896 was shaped primarily by four guiding principles:

1. that land suitable for settlement should not be "interfered with for the purposes of tree planting" (AJHR, 1911, C1B, 5)
2. Crown lands should be utilised as far as possible
3. plantations should be accessible to railway lines
4. areas of open land, not adjacent to standing forests but which appeared suitable for planting, should be utilised.

Figure 7.6


PRIVATE PLANTATIONS IN NEW ZEALAND, 1890-1919
100,000
50,000
0
ACRES OF PLANTATION
1890
1895
1900
1905
1910
1915
YEAR
NO DATA
NO DATA
NZ Year Books

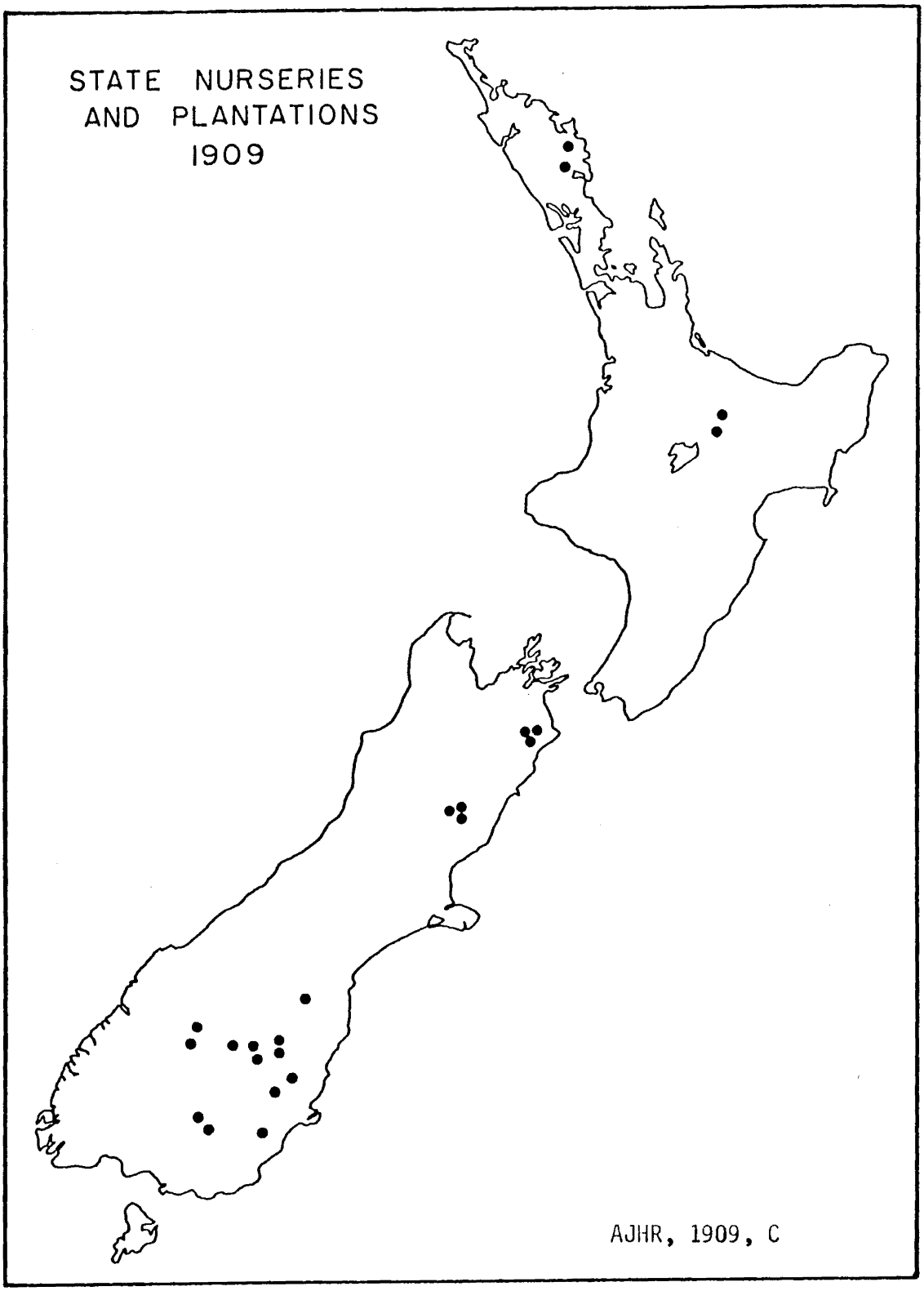
Figure 7.7


PLANTATIONS OF FOREST TREES ON PRIVATE LANDS 1916
No. of Acres
20 000
10 000
2 000
1 000
NZ Statistics

These four guidelines indicate something of the Government's attitude to afforestation. The settlement ethos remained sacrosanct. Indigenous forest management and exotic afforestation were regarded as interference with this purpose. Not surprisingly, the afforestation efforts were to be concentrated on Crown Lands. The alternative of repurchasing freehold areas was expensive and would have potentially conflicted with the principle of the primacy of agricultural usage by taking back lands available for development under private ownership. In addition, it provided a means of utilising the "waste lands" of the Crown that were unsuitable for any other purpose. The location of plantations accessible to railways was intended to facilitate the speedy transportation of wood to urban markets, where the timber industry and its downstream associates were a major manufacturing employer. The final guideline that open lands away from indigenous forest should be utilised encapsulates several earlier ideas about environment and settlement goals. Implicit was the belief that naturally forested areas were suited for settlement, that the lushness of vegetation indicated the fertility of the soil. Such lands were best fitted to settlement. Equivalent ideas from early nineteenth century New Zealand have been reviewed by Johnston (1979). Afforestation was therefore directed towards barren areas, where, again by implication, the plantations would enrich the soil and also improve the climate by attracting rain.

State nurseries were established at Tapanui and Eweburn in Otago and at Whakarewarewa near Rotorua in 1896. By 1909, plantations totalling 12 175 acres had been established in Otago, Canterbury, Marlborough, Rotorua and North Auckland (Figure 7.8). The North Auckland and Marlborough nurseries and associated plantations were not a success and were subsequently discontinued. The growth in acreage was steady with average annual planting amounting to over 2500 acres after 1908 so that by

Figure 7.8



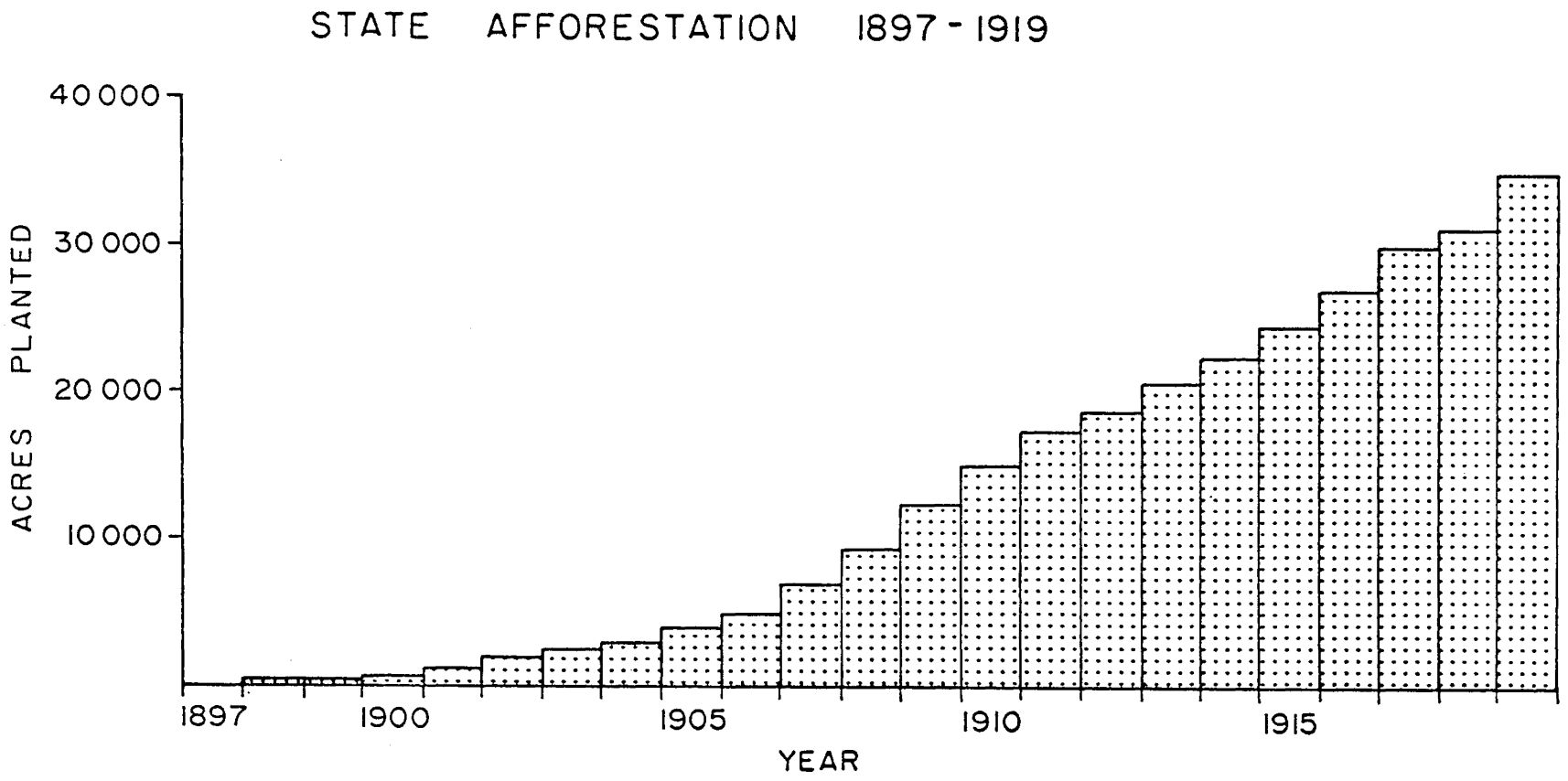
1919 exotic plantations totalled slightly over 35 000 acres (Figure 7.9).

By 1911 State Afforestation policy was focussed on exotic species. There was a four fold rationale for this was based around perceived flaws in the indigenous forest species. The first and most important reason given was that indigenous forest trees required "an inordinate length of time to grow, and arrive at maturity" (AJHR,1911, C1B, 3). Secondly, the surface rooting indigenous forest species were liable to windthrow and ill-adapted to exposure to wind and sun. Thirdly, indigenous forest species required considerable shade and careful treatment to be raised successfully. Fourthly, exotic forest trees were much faster growing than the indigenous species. The inevitable conclusion was that,

> "Under these circumstances, it has been generally recognised it is out of the question to attempt to renew the indigenous trees for future commercial purposes, except to a very limited extent, and all that can be done is to conserve the remaining supply as far as practicable so as to allow sawmilling to proceed under conditions that will ensure the greatest possible use being made of the existing timber"
>
> (AJHR, 1911, C1B, 3)

Government afforestation policy was very much shaped by the perceived negative attributes of indigenous forests. A little information, of a diffuse and imprecise nature, played an important role in shaping a Government policy. Later, when the enhanced growth rates of exotics became apparent, a new positive argument was added. However, in the years up to World War One, scientific investigations into the growth rates of indigenous forest species caused a revision of attitude towards the merits and role of afforestation and indigenous regeneration.

Figure 7.9



AJHR, C1

7.5 GROWTH RATES DEBATED (1865-1920)

The interest and enthusiasm for exotic afforestation stemmed from a positive factor: the encouraging results obtained from experimentation with exotic species, and a negative dimension: a belief that the indigenous forest flora, particularly Kauri, was slow growing. The difficulties encountered in propagating indigenous forest species probably lent support to this view. Botanists, engineers, and foresters, each from a different perspective, and with diverse purposes, contributed to a debate over growth rates. In consequence, the "scientific" appraisal of the growth rates question altered, sometimes to extremes, with important implications for exotic afforestation and indigenous management strategies.

The initial opinion on the growth of indigenous forests stems from observations originally published in 1875 by Laslett, a Timber Inspector with the Admiralty who made several visits to New Zealand in 1840-1843. Other contributions were made by Hochstetter (1867) and Blair (1876). Laslett judged the Kauri to be, a

> "slower growing tree than most firs and pines; it is slower even than the Pitch Pine of America, and makes only one inch of wood diameter in about six or seven years."
>
> (Laslett, 1894, 389)

He estimated that the 72 foot circumference Kauri at Mercury Bay to be 2000 years old. Hochstetter suggested that Kauri of fifteen foot diameter was 700 to 800 years old and observed ten to twelve annual growth rings to the inch. Blair, an engineer, in a survey of the building materials of Otago, made estimates of the growth rates of indigenous forest trees in that region. Cedar, he believed, "grows faster than most European timber trees" (Blair, 1876, 153). Miro, Rimu and "black birch", he also considered to be fast growing, while Totara was described as a "comparatively slow grower." This survey

was widely referred to and despite Blair's previously quoted observations was used to support the contention that the indigenous forest species were slow growing.

Toward the end of the nineteenth century, the view that indigenous forests were slow growing gained support. It is somewhat paradoxical that a prime contributor to this reappraisal was Thomas Kirk, the first Chief Conservator of Forests and an eminent botanist. He argued that ten annual growth rings to the inch was a "fair average of a growing (Kauri) timber" (Kirk, 1889, 144). He also referred to ring frequencies of up to 30 per inch which led him to estimate the age of some specimens of Kauri at 4000 years. Matthews, the Chief Forester, drawing on Kirk (1889), and Blair (1876) and some data from a plantation of native species in Thames for maturation times, posed the question,

> "would the Forestry Department be justified in planting any ... (indigenous) trees with a view to providing for the wants of the future, when two or even three crops of exotic trees - such as Oak, Larch, Spruce, Oregon Pine or Eucalypt could be produced within the same period that one crop of native trees would take to reach maturity?"
>
> (Matthews, 1905, 78)

Not surprisingly Matthews saw only a limited role for indigenous afforestation.

The next contribution to the growth rates question was by Stewart (1905) who provided some statistics on indigenous trees known to have been planted in 1865, but more importantly by observation of ring counts of trees of known age, confirmed that Kauri produced only one growth ring annually.

An investigation of major importance which overshadowed the previous studies appeared in 1913. Authored by Thomas Cheeseman, curator of the Auckland Museum, the paper entitled The Age and Growth of Kauri was specifically directed towards the question of indigenous forest growth rates. He noted the tendency for exaggeration in human

nature and concluded that this had happened in the case of the Kauri where he suggested even "careful writers" such as Kirk and Blair had assigned ages of over 4000 years and 3600 years respectively to large specimens, "although neither gentleman appears to have counted the annual growth rings of even a single complete section" (Cheeseman, 1913, 18).

Cheeseman ventured the opinion that a neglect of Laslett's work had produced "from subsequent writers many rash and unsupported statements which otherwise would never have been made" (Cheeseman, 1913, 10). He then proceeded to attack Kirk's earlier work, claiming his assumptions were faulty and not supported by evidence. Specifically, Cheeseman argued that Kirk's two estimates of an average of ten growth rings to the inch for a five foot diameter 300 year old tree and 30 growth rings to the inch for a seven foot diameter 1260 year old specimen were incompatible. Data collected by Cheesman produced an average of 9.7 rings to the inch.[3] On this basis Kauri trees dated by Kirk at 4320 and 3960 years were reassessed to be only 1398 and 1280 years respectively. That is to say, they grew more rapidly than Kirk believed.

Cheeseman demonstrated that Kauri grew faster than previously been thought, but still considered the species "much slower than most trees of economic value" (Cheeseman, 1913, 19) taking an average of 116 years to reach a two foot diameter and 174 years for three feet. "Periods like these,"[4] he concluded,

> "are much too long to offer any hope of monetary returns from the planting of kauri, even if there were not other reasons to advance against such undertaking"
> (Cheeseman, 1913, 19)

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3. In fact an arithmetic error occurred in the calculations: 8.5 rings to the inch was more accurate.

4. David Hutchins, an eminent British forester, considered growth of nearly two feet in a hundred years more than sufficient as a basis for scientific forestry in New Zealand (see section 7.6).

State exotic afforestation was thus apparently vindicated. But this view received a serious challenge from David Hutchins, a visiting forestry expert employed by the Government to report on the Dominion's forests, in 1916. He argued that,

> "Forestry in New Zealand has been entirely misjudged by the entirely erroneous idea that New Zealand native timber-trees grow more slowly than the ordinary timber-tree of other countries"
>
> (Hutchins, 1916, 301)

On these grounds, and for cost minimising arguments, Hutchins argued for indigenous management rather than afforestation as the solution to New Zealand's timber supply problems. In his subsequent report on New Zealand Forests (Hutchins, 1919) he expanded his arguments and lauded Cheeseman (1913) for dispelling the popular notion of the slow growth of Kauri, dismissed Kirk (1889) as not understanding the true significance of his data, and insisted that Matthews (1905) had also misinterpreted his information. In Hutchins' opinion, the indigenous trees grew "about twice as fast as European forest trees" (Hutchins, 1919, 18).

Hutchins' views were not accepted unanimously. Maxwell (1919), an afforestation advocate (see also Maxwell, 1930), marshalled evidence in favour of faster growth of exotic species. The implication that Maxwell drew from his analysis was,

> "that it would be an utterly hopeless undertaking to attempt to provide even a small portion of future needs in timber by growing native trees"
>
> (Maxwell, 1919, 372)

Hutchins replied to Maxwell in 1920. He claimed that Maxwell did not clearly distinguish between "arborculture" (individual trees) and "forestry" (mass trees). The former was concerned with unit growth per tree and the latter timber production per area. Hutchins did concede that there was a place for exotic plantations in New Zealand, because of the comparatively small area of forest and because

some exotics showed "an extraordinary rapid growth" (Hutchins, 1920, 1) under local conditions. But he argued that Maxwell had compiled a diverse set of data, not all directly comparable because of variations in collection procedure. His major point, however, was that New Zealand forest trees in situ grew faster than European forest trees in their own environment. In Hutchins' opinion the faster growth of some exotic species was not crucial:

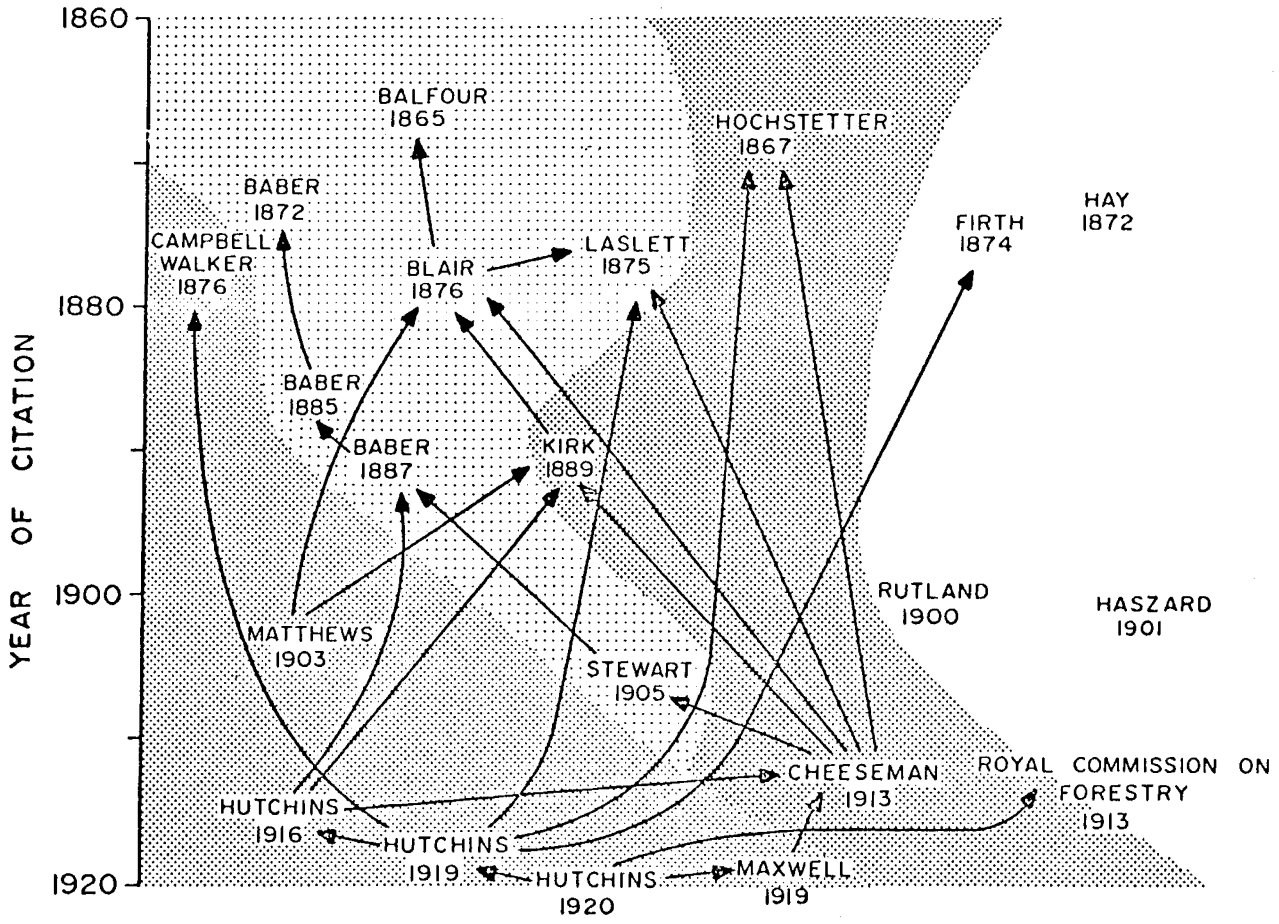
> "as long as there are no costs of planting plus interest on the native trees, it does not much matter if they do take considerably longer to produce their timber than costly and doubtful exotics."
> (Hutchins, 1919, 4)

Scientific opinion on the growth rates question vacillated over time and did not cease in 1920. The various contributions of foresters, engineers and botanists can to some extent be assessed through the use of a citation network. This is a diagram organised chronologically and indicating published papers cited subsequently. Garfield (1970) illustrated this approach with the example of Mendel's pioneering genetics paper and suggested that it helped identify key individuals whose work had enduring impact in the field and to disprove myths about past influences. Usually cited publications dealing at least in part with the growth rates of native timber up to 1920 are depicted in Figure 7.10. Accepting that there are some construction problems as nineteenth century citations were not streamlined and informal personal communication was frequent, some patterns still emerge.

The citation network clearly indicates that Laslett and Hochstetter's work was neglected in the nineteenth century. This oversight was perhaps the source of some of the confusion over indigenous growth rates. Instead, the standard reference was that by Blair (1876) who was less interested in growth rates than in the quality of the timber. Subsequent authors interpreted his data as showing that

Figure 7.10

A CITATION NETWORK FOR THE GROWTH OF INDIGENOUS FORESTS IN NEW ZEALAND 1865-1920



indigenous forest trees grow slowly. Cheesman's (1913) paper emerges as a comprehensive review of the earlier published work and was in turn acknowledged as important by Hutchins (1916) and Maxwell (1919). The citation network also isolates engineers, botanists and foresters as three groups (indicated by tone on diagram). The engineers in particular worked in isolation or cited work by others from their own field. In contrast, Cheeseman and Hutchins ventured more widely in their contributions. However, the foresters tone permeates Hutchins writings; he favoured above all indigenous rotational forest management. Hutchins played a key part in subsequent developments leading to the establishment of an autonomous forests department and his role is examined in more detail in the next section (7.6).

7.6 ORIGINS OF THE STATE FOREST SERVICE

Aspects of the wider social and economic climate affecting forests and forestry management have been discussed in the preceding sections of this chapter. Arguments in favour of afforestation gained ascendency in official circles. Within this wider set of conditions, key individuals and events interacted in a series of steps leading to the creation of a State Forests department, the third to date. For convenience, four successive stages may be identified; 1. a period of mounting concern (1904-1913), 2. the appraisals of a forestry expert, 3. the formation of a forestry interest group, and 4. political initiative to reform forest management.

7.6.1 Mounting Concern 1904-1913

Members of the timber industry had long been sensitive about their future (viz the Timber Conference of 1896, see also Chapter VI). In the early twentieth century, official concern with the depressed

state of the timber industry, burdened by over capacity and limited supplies, was manifest in a series of reports (AJHR, 1905, C6; 1907, C4; 1909, C4). Concern about the existing structure and future of the timber industry brought about The Timber and Timber Building Industries Commission (AJHR, 1909, H24). The Commission of eleven was chaired by Thomas Duncan, a former Minister of Lands, and included representatives of the sawmill industry and others such as Harry Ell with a more general interest in forests. The Commissioner's terms of reference required them to investigate allegations that,

> "the conditions under which the timber and timber-building industries are carried on in New Zealand are unsatisfactory and it is expedient that enquiry should be made with a view to improving the same and generally promoting the development of those industries."
> (AJHR, 1909, H24, i)

154 witnesses from all quarters of timber industry were interviewed. Enquiries centred upon the costs of felling, price structure within the industry, and the areas of Crown forest available for saw milling purposes. The Commissioners' report is somewhat contradictory; one newspaper reported that its meetings had been "marked by numerous divisions" (The Dominion, 23 June 1909). A section of the final report reiterating arguments in favour of watershed protection and setting aside forest areas for future requirements which has the hall-marks of Ell, rests uneasily with a recommendation that the Government make more extensive use of indigenous timber for public works "with the view of assisting to relieve the present depression in the timber industry" (AJHR, 1909, H24, xiv).

Mounting concern for the forests culminated in the appointment of a Royal Commission on Forestry in 1913. This was a more broad based and prestigious enquiry than the 1909 Commission. The terms of reference instructed the Royal Commission to ascertain how indigenous forests should be managed and to consider the adequacy of afforestation

operations to meet future demands. Specifically, they were to report upon ten points,

1. indigenous forest lands which it was desirable to retain for soil-protection, water conservation, flood preventation, climatic and scenic purposes

2. indigenous forests not included in the above, but which were suitable for settlement, sawmilling or other commercial purposes and when such areas should be utilized

3. the best method of dealing with indigenous forests in the public interest

4. whether white pine exportation should be prohibited in view of the demands of the butter industry[5]

5. with regard to afforestation, the probable future demand for timber in New Zealand

6. the nature and kinds of timber likely to be required

7. to what extent would existing state afforestation meet the probable demand

8. to what extent and where should afforestation activities be supplemented and expanded

9. was present state management and control of plantations adequate

10. under what conditions should the state assist private tree planting.

The Royal Commission was chaired by Henry Haszard, the Commissioner of Crown Lands for Westland. Unlike the 1909 Timber Commission, it was not composed primarily of Members of Parliament. Although the commissioners had all displayed some interest or involvement with the forests question, no professional forester was included amongst their number. Indeed, it is doubtful that anyone with the appropriate credentials could have been found in the country.

The Royal Commission interviewed 74 witnesses from a wide range of occupations and received 142 submissions from interested parties

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5. White pine provided butter boxes which did not taint the product.

unable to attend the hearings in person. Witnesses were drawn from a spectrum of occupations: sawmillers, timber merchants, nurserymen, farmers and scientists and included Harry Ell. Others of note who forwarded submissions included J. B. Armstrong, curator of the Christchurch Botanical Gardens and author on forestry related topics (see Chapter III), George Thomson MP, who had an important involvement in early efforts directed towards flora and fauna preservation (see Chapter V), Professor Grossman who repeatedly pointed out the dangers of deforestation (Grossman, 1908, AJHR, 1909, C4), Alexander Bathgate, who successfully agitated for the establishment of a New Zealand Arbor day (see Chapter VI) and J. Ellis, chairman of the South Auckland Sawmill Association. Armstrong, Thomson and Ellis were unanimous in their belief that an independent forestry department was required (Inward letters, Royal Commission on Forestry, F11/1).

The recommendations of the Royal Commission on Forestry were wide ranging, a reflection of the broad terms of reference. Broadly they can be arranged as concerned with 1. forestry settlement issues, 2. the treatment of indigenous forests, 3. afforestation and 4. an administrative restructuring. The Commissioners endorsed the status quo over the competing interests of forests and settlement:

> "It may be stated as a broad principle that no forest land, except if it be required for the special purposes of a climatic or scenic reserve and which is suitable for farm land, shall be permitted to remain under forest if it can be occupied and resided upon in reasonably limited areas"
> (AJHR, 1913, C12, xx)

In practice, however, areas suitable for climatic or scenic reserves frequently had little value for settlement. The Commissioners suggested that the public interest would be best served by a fourfold classification of forest lands (Table 7.4). In effect this was an attempt to match land capability with land use. They also advocated a national park of 200 acres in the Waipoua Kauri Forest. In the case of quality

timber on settleable lands, it was strongly recommended, "in consequence of the increasing scarcity of timber that all land containing milling-timber shall have such converted prior to settlement" (AJHR, 1913, C12, xx). However, they noted that present and future utilization of the forest would require a careful forest inventory.

The Commissioners unhesitatingly supported the retention of Crown Forest for "climatic" (soil and water protection and shelter from wind) and scenic values. Cautiously worded criticism was also voiced about introduced deer:

> "we fail to see that deer are not harmful in a forest, or that the monetary gain to the country can in any way counterbalance the damage they must eventually do to the climatic reserves"
>
> (AJHR, 1913, C12, xv)

Thirty years was accepted by the Royal Commission as the duration of indigenous timber supplies unless tighter controls were enacted. Importation was a costly option, and besides, a world timber shortage was anticipated. This in the Commissioners' view left only afforestation. After reviewing the existing operations they concluded that,

> "We are fully persuaded, however, that given cheap land, economical management, and the right kind of trees to plant, afforestation can be made a highly profitable investment for the State, apart from the secondary benefits of a good timber supply to meet public demand and a possible amelioration of climatic conditions"
>
> (AJHR, 1913, C12, xxx)

Looking to the future, the Royal Commission suggested that administrative reform was necessary. They recommended, 1. placing the control of the Forestry Branch of the Lands Department under an executive officer of approved administrative and financial ability and 2. creating an advisory board of forestry experts meeting at least quarterly to assist the executive officer. Unfortunately, World War One intervened before any of these proposals could be put into operation.

The Royal Commission's report was subsequently scrutinised by

Table 7.4

CLASSIFICATION OF FOREST LANDS AS PROPOSED BY THE ROYAL COMMISSION ON FORESTRY, 1913

Category	Description
A	Forests with valuable milling timber in positions suitable for settlement
B	Forests with valuable milling timber in positions unsuitable for settlement
C	Forests with insufficient or unsuitable milling timber on land suitable for settlement
D	Forests with insufficient or unsuitable milling timber on land unsuitable for settlement

Source: AJHR, 1913, C12.

British forest experts Sir William Schlich and David Hutchins. The former described the foresaking of indigenous forestry for plantations as a "very bold measure" (Schlich, 1918, 207), but one that he had reservations about. Thus Schlich posed three questions; 1. were the indigenous forest growth rates as slow as credited?, 2. would the exotic timbers yield quality timber?, and 3. what of the risk of disease in plantations? Using data on the growth of Totara and Oregon Pine, he argued that the indigenous forests were not as slow growing as was commonly argued. Thus he urged permanent State forests managed on the basis of sustained production. He was also critical of the proposed restructuring of the Forestry Branch of the Lands Department. Instead he favoured the appointment of a forestry expert and trained staff with afforestation efforts merely augmenting the returns from State Forestry.

Another critic of the Royal Commission on Forestry was David Hutchins, an experienced forester, who was reporting on Australian forestry (Hutchins, 1916; Powell, 1976). Hutchins soundly criticised the Royal Commission in an appendix to the main report. He made much of its lack of "technical advice on forestry" (Hutchins, 1916, 398) and was critical of the Commission's acceptance of settlement as the primary land use where the land was only just of sufficient quality for agriculture. In this respect he showed a professional's belief in exclusive knowledge, and a lack of understanding of New Zealand conditions. Thomas Adams, a member of the Commission and an amateur arboriculturalist made an important contribution to exotic afforestation, and it was inconceivable in view of the prevailing ethos that the Commission would do anything other than accept settlement primacy. Hutchins' other criticisms were widely spread, from questioning whether indigenous forests grew as slowly as was commonly supposed, to the

absence of direction and expertise in the afforestation programme, and the lack of an independent Forest Department. His professional ire was aroused by the Commission's assertion that "forestry is not a science in itself, but a combination of many sciences together" and that a trained forester would be "altogether ignorant of both New Zealand conditions for tree planting and of the indigenous forest" (AJHR, 1912, C13, xxxviii). This was not the first occasion on which New Zealanders perceived of their environment as having unique attributes best handled by local "practical knowledge" rather than by European trained "theorists". One of Hutchins most scathing remarks was reserved for the Commissioner's acceptance of afforestation over indigenous management. This was an anathema to a forester imbued with ideas of sustained management:

> "one thing is certain: to talk about cutting the indigenous forest down and replanting it as a general measure (which is the idea running through all of the report) is like expressing today a belief in witchcraft."
> (Hutchins, 1916, 392)

Little did Hutchins realise that he would be invited to inspect and report on the Dominion's forests in 1915.

7.6.2 A Forestry Expert's Appraisal of the Forest Question

David Hutchins gained his Forestry diploma from the famous L'Ecole Nationale de Eaux et Forets at Nancy, France. Gifford Pinchot, a prominent force in United States forestry, was also trained at this institution. Hutchins worked initially in the Indian Forest Service and later in South Africa where he had experience in applying scientific management to indigenous forests and with plantations of exotics. Upon retirement he was employed by the Colonial Office to report on forestry in Kenya and Cyprus. In 1914 he toured Australia with the British Association for the Advancement of Science and was invited to

prepare another report (Hutchins, 1916; Powell, 1976, 126).

Hutchins' services were procured through the efforts of Sir James Wilson, President of the Board of Agriculture (Wild, 1953). In October 1914 Wilson wrote to Prime Minister William Massey,

> "that it would be a good thing for the Country if Mr Hutchins could be induced to make some stay here, and to furnish the Board with a report on the subject of afforestation, such as was made by him on the forests of British East Africa"
>
> (Wilson to Massey, 19.10.14, F10/3/2, 1)

Following a prompting note by Wilson, the Under Secretary for Lands suggested "favourable consideration" be given to Hutchins' preparing a report. An official letter was forwarded to him in March 1915. Hutchins replied in the affirmative saying that,

> "New Zealand forestry has an especial interest to me since the general forest seems similar to that of South Africa. The indigenous trees are very slow growing;[6] will not succeed away from their own environment; and generally useless for planting purposes"
>
> (Hutchins to Under Secretary for Lands, 24.5.15, F10/3/2)

More detailed requirements were formulated in later correspondence to the effect that Hutchins should,

1. inspect the chief plantations in the Country
2. visit sawmills in indigenous forests in the North and South Islands
3. report on the best methods of afforestation
4. report on the scale of operations required to meet future demands.

In return he was offered a per diem allowance of 15/- plus hotel expenses and a tourist rail ticket (an honorarium of £100 was later added).

The official expectation was that Hutchins would confine his remarks to afforestation. This was not unexpected in light of contem-

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6. This view he rapidly revoked on reaching New Zealand, instead arguing that the New Zealand forests grew faster than European species in situ.

porary assessments that future timber supplies would be met from plantations and not indigenous forests. Such an outlook was untenable to a professional forester such as Hutchins. Making no concessions to his age (65) he complained that,

> "An inspection limited to places by rail would scarcely be a satisfactory arrangement. I am accustomed to camping in the forest and walking 15 miles a day: and I do not care to make recommendations based on incomplete local knowledge"

"The issues appear to be," he continued to say, "of far-reaching national importance",

> "On the face of it, to cut down the indigenous forest and replace it by plantations of exotics is necessarily expensive, and may be risky. The matter certainly requires very careful study"
>
> (Hutchins to Under Secretary for Lands, 26 June 1915, F10/3/2)

The Under Secretary of Lands replied to the effect that "a report on our Native Forests is not required, but only an inspection and report on our afforestation operations" (Under Secretary of Lands to Hutchins, 1.10.15, F10/3/2). Hutchins was undeterred, and began his inspection.

Hutchins's achievements over the ensuing five years until his death[7] were impressive. They included an inspection of and reports on New Zealand forests (1918, 1919), popularisation of forestry issues by a lecture tour, and giving impetus to the foundation of the New Zealand Forestry League.

7.6.3 A Forestry Interest Group

The New Zealand Forestry League was founded early in 1916 by Sir James Wilson and Alexander Bathgate. Hutchins - another prime mover - was present at the inaugural meeting and addressed the audience on the topic of scientific forestry in New Zealand (Hutchins, 1916 a). Hutchins considered that French and Belgian Forest societies served a useful

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7. He was knighted shortly before his death.

public role. He was also aware of the foundation of an Australian Forestry League in 1911 (Hutchins, 1916, 161) and this provided a model for the New Zealand league. The twofold function of the league should, he argued, include the gradual education of public opinion on forestry and ensuring that party politics and hasty actions did not "interfere with the great far-reaching interests of the country in its national forestry" (Hutchins, 1916a, 392). These purposes would be facilitated by leaflets and a forestry journal.

Twelve councillors were elected at the league's inaugural meeting. On the whole they were respectable, distinguished and relatively aged (Table 7.5). Nine of the twelve appeared in various editions of Who's Who in New Zealand. Included amongst their number was Edward Phillips Turner, the first head of the independent forest department in 1919 and second Director of Forests from 1928-1931. League membership numbered about 500 by 1927. Clearly influenced by Hutchins, the league advocated reform of forestry in New Zealand. For example in his 1919 presidential address, Sir James Wilson spoke in favour of continued demarcation of forests, a census of private plantations, a vigorous policy of planting on Crown dune lands and passage of a State Forest Act with a separate forests department. Demarcation and a forestry department were central concerns to Hutchins.

The New Zealand Forestry League was one of the earlier public interest environmental groups in the Dominion. It had many of the features of a present day pressure group including collective commitment, specific objectives, an organisational structure, expertise, influence and an extra-government existence. The New Zealand Forestry League, as an interest group displays an amalgam of the characteristics O'Riordan (1979) distinguished in British and American groupings in the 1960s and 1970s.

Table 7.5

INAUGURAL COUNCILLORS OF THE NEW ZEALAND FORESTRY LEAGUE, 1916

Councillor	Age	Occupation	Status
Sir James Wilson	68	Farming	MHR., President of Board of Agriculture
Sir Walter Buchanan	64	Farming	MLC
Hon David Buddo	60	Farming	MLC
William Fergusson	64	Engineer	Chairman of National Efficiency Board[1].
William Hunt	49	Company Manager	Member National Efficiency Board
Edwin Hall	?	Farmer	
Arthur Leigh Hunt	40	Stock Broker	
Alfred Cockayne[2].	36	Government Botanist	
Edward Phillips Turner	55	Inspector of Scenic Reserves	
R Reynolds	?	Farmer	
B Chambers	?	?	
James Deans	29	Farmer	afforestation enthusiast

Notes:

1. A wartime board

2. Son of Leonard Cockayne.

British interest groups have traditionally operated through social patronage and resolved conflicts by confidential discussion. In North America, pressure placed on high officials was more public and occasionally antagonistic. Here, from early in the twentieth century, a protectionist ethic was also accepted by some government administrations with important consequences. New Zealand's form of Government was based on that of Britain. The New Zealand Forestry League became a pressure group of some influence through connections to high level bureaucratic and parliamentary decision makers. The New Zealand equivalent of the American frontier tradition and environmental change, which was perceivably rapid in late nineteenth century New Zealand, led to protectionist mechanisms being instituted within the Lands legislation and by specialised scenery preservation and national park legislation. The frontier tradition also manifest itself in the propaganda activities of the Forestry League, through pamphlets, meetings and its journal (initially The Forest Magazine of New Zealand, later renamed New Zealand Life). By 1916 the loose group of influential individuals, equivalent to that described by Wynn (1977, 1979), who played a vital role in forest management in the 1870s (see Chapter III), had formalized their interests and emerged as a special purpose organisation dedicated to propounding the cause of forest management in New Zealand.

7.6.4 Political Initiatives Leading to Reform of Forest Management

David Hutchins' personal efforts, in the form of professional reports and as a populariser of scientific forestry in lectures and press articles, did much to sustain interest in forestry throughout the war years, which had prevented the recommendations of the Royal Commission of 1913 from coming to fruition. Hutchins' cause was taken up in 1918 by Sir Francis Bell the Attorney General. Bell, influenced

by Hutchins and wider opinion on a post war world timber famine consequent upon excessive demands during hostilities (eg. Jeanneney, 1978), pressed for reform of forest management.

Hutchins' (1919) report on New Zealand forestry expanded, in somewhat repetitive fashion, his earlier arguments, and set them within an antipodean context. He confidently espoused principles of forest management which were unequivocably accepted by foresters. Hutchins' report was the most comprehensive and technical review of New Zealand's forests to that date. His observations on indigenous forest management, plantations and forestry and settlement are of especial significance.

Experience of indigenous forest management in South Africa, led Hutchins to assert that the same principles would be applicable in New Zealand. With allowance for special uses and scenic purposes, he foresaw,

> "the Kauri tree of the future, grown in the cultivated forest for economical forestry, will be a tree of about 110 years old and two feet in diameter"
> (Hutchins, 1919, 73)

This growth rate was better than that of European forests where a hundred years produced diameters of about one foot. Rotational forestry was successfully conducted in Europe. Hutchins had every confidence that this system of forest management would be viable in New Zealand. He also sought to dispel the idea that kauri had to attain huge proportions before it could be milled. The actual working of the forest was to be guided by working plans, which specified "the purpose for which a forest was to be managed so as to best meet the interests ... of the owner" (D'Arcy, 1910, 15). In accessible areas Hutchins envisaged intensive working under approved sylvicultural systems. He conceded that some systems[8] might emerge as more effective

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8. A range of systems including selecting felling, group felling, and strip felling are described by Hutchins (1919, 789). See also Schlich (1896, vol. 1, 261-283).

than others in the New Zealand environment. However, the crux of Hutchins' proposals was that timber supplies would come from controlled natural regeneration.

Hutchins also devoted some attention to plantations, although not in the vein that Government administrators would have preferred. He listed five disadvantages of plantations,

1. the cost of planting
2. the amount of interest charged against the cost of establishment over perhaps forty years in comparison to forests where there was no charge
3. the risk of planting exotics, including that of failure to acclimatise, failure of early growth promise, of disease, of poor natural reproduction and maturity, and of poor quality timber being produced
4. loss of the forest soil in destroying the forest and planting on bare ground
5. difficulty with shade tolerant species, the best timber species in the New Zealand environment.

Against these he cited only two advantages; the early production from species such as Pinus radiata and various Eucalypts and the somewhat slower production of good matured heart-wood timbers. Probably the critical aspect of Hutchins' view was the more sophisticated economic costing that he applied to exotic afforestation: considering its opportunity cost. He asserted that the £2 000 000 in total then spent on exotic plantations would have been better directed towards indigenous forest management. The objections raised to exotic afforestation in New Zealand were not merely those of a dogmatic forester aghast at the suggestion that indigenous management should be rejected without professional consultation. Hutchins had experience with afforestation in Southern Africa and even favoured the interplanting of exotics in indigenous forests and regeneration. He accepted that advantages accrued from the introduction of valuable trees, but asserted that this was "common to both cultivated forests and forest plantations"

(Hutchins, 1919, 151).

Hutchins was also astute enough to realise that he had to present forestry as a viable land use option versus settlement. Using examples of monetary returns and employment potential, Hutchins asserted that forestry was often an economically appropriate land use. This would in time produce his own version of a rural arcadia:

> "State forest employees are settled more permanently on the land than most farmers; they earn more than the average dairy-farmer, and, settled in model hamlets, escape the isolation and monotonous life of the isolated farmer"
> (Hutchins, 1919, 183)

Hutchins' reports were presented to parliament in 1919, by which time other changes were underway.

The efforts of Hutchins, the New Zealand Forestry League, and the threat of an Empire-wide post-war timber famine were sufficient to awaken Sir Francis Bell's interest in forestry. Bell, the Attorney General and leader of the Legislative Council, formerly a successful lawyer, was a man of ability and influence, having the confidence of Prime Minister Massey. Bell had come to the conclusion that the existing forestry legislation, which was Vogel's 1885 Act, although it had been consolidated in 1908 after New Zealand achieved Dominion status, required revision. However, as Stewart a political contemporary and Bell's biographer indicated, instigating a policy for a constant supply of timber to the New Zealand market, "brought him into contact with various vested interests, and with political opposition that had to be overcome" (Stewart, 1937, 191). Land settlement and the sawmilling industry were the principal vested interest groups that Bell faced.

The Royal Commission on Forestry, Hutchins, the New Zealand Forestry League, The Industries Committee (AJHR, 1919, I12); all had advocated the creation of a separate forests department. Bell accepted

that such a step would further the cause of forestry and in November 1918 was successful in having the office of Commissioner of State Forests separated from that of Minister of Lands. He cited logistical reasons as a cause for not immediately seeking administrative independence by creating a new and separate department. Edward Phillips Turner, the former Inspector of Scenic Reserves, was appointed to the position of Chief Officer of Forestry.

In April 1919 Bell addressed the Commissioners of Crown Lands on forest policy. He defined the scope of his policy as concerned primarily with Crown Forests, although he conceded that possible future developments included planting encouragement schemes and repurchase of freehold. He was also adamant that timber exports would have to end. Hence the acrimony of the Dominion Sawmillers Federation (Ward, 1967). Bell pronounced his policy as one,

> "which shall as far as possible conserve for the use of the people of New Zealand both in the present and for the future, such public lands now covered with timber, as are not required for land-settlement purposes, and for the plantation of areas of open land which though not required for land-settlement purposes are suited for planting and afforestation"
>
> (Bell, 1919, 314)

Land settlement had long been the bane of state forestry efforts in New Zealand; returning servicemen exacerbated this situation, effectively prohibiting the retention of all forested land for forestry purposes. Bell accepted that forest land suitable for agricultural purposes would be cleared but argued that care and attention was required where the forest land was marginal for settlement. In these cases he considered it was best to retain the land as State Forest. Exotic plantations were not of central importance to Bell:

> "The forestry I want to initiate consists, first and foremost of conservation and use of existing forests, and, secondly, and far behind plantations"
>
> (Bell in Stewart, 1937, 192)

This reorientation was largely Hutchins' doing as Sir James Wilson noted:

> "One's whole thought has been towards planting as a remedy for the scarcity of timber which must occur in the future, but his advocacy of a Forestry Department with a trained Forester at its head for the purpose of conserving our native bush is one which was ignored previously"
> (Wilson to Edwin Hall, 9.8.16 in Wild 1953, 119)

Hutchins had proposed a comprehensive survey and demarcation of forest lands. Bell realised that under the circumstances the cost and time would be prohibitive. Instead he took a bold new initiative and passed an amendment to the State Forests Act in 1919. This allowed any Crown Land to be proclaimed as provisional State Forest. The demarcation would then be decided between the Forests and Lands Departments. The effect of this simple step was significant: in one action Bell shifted the onus of proof from forestry to lands. No longer did forest administrators have to justify as forested area a State Forest; now Lands personnel had to make a case that forest land was suitable for settlement. Bell's next act was to achieve full administrative and legislative independence for the Forests Department.

7.7 SUMMARY

The land settlement ethos remained ascendent in New Zealand into the twentieth century although small gains had been made in the form of concessions to climatic forest reserves and scenery preservation (see Chapter VI). Land settlement was a major contributor to deforestation, the speed of which raised fears of a likely timber famine. Other major contributors included fire and the timber industry itself. At the same time, the acceptance that even forest lands only marginally suited for settlement would be turned over to this purpose mitigated against the growth of interest in managing these lands to other ends.

Difficulties experienced with regenerating indigenous forest species and attributing them slow growth rates high-lighted exotic afforestation as the solution to any timber famine. Several decades of experimentation with a range of European, North American and Australian species identified some varieties such as Pinus radiata, which grew faster in New Zealand than in their indigenous habitats. This fact was used in support of afforestation.

In this wider context the achievements of Hutchins, Bell, and the New Zealand Forestry League emerge in clearer focus: the long term basis of production forest management in New Zealand was turned from afforestation back to indigenous forestry by 1919. The implementation of this new forest policy is the subject of Chapter VIII. Why were they successful in reversing official thinking? Presumably the timing was opportune, as the war effort had overtaxed European forests and apprehension about future supplies was mounting. This concern was diffused throughout the Empire.

Whereas the 1870s and 1880s may be described as periods of lost opportunities in forest management, the war years and those immediately preceding were characterised by opportunities seized. Hutchins' presence in Australia in 1914 was capitalised on by Sir James Wilson, President of the Board of Agriculture. Wilson had sufficient influence to make successful representations to the Government to secure Hutchins' services. It must be emphasised however, that Wilson and Lands Department officials intended that Hutchins would concern himself with afforestation. The invitation to visit New Zealand also came at a fortunate time for Hutchins, recently retired from the colonial service and having completed his investigations on Australian forestry, who was offered a contract in a country that had previously attracted his interest. He had included an appendix dealing with New Zealand forests

in the Australian forestry volume (Hutchins, 1916a). In addition he drew botanical and administrative parallels between Southern Africa and New Zealand forests.

Sir Francis Bell was persuaded by Hutchins' arguments to seek the administrative independence of a forests department working toward indigenous forest management. Bell had ability and influence in Cabinet. These attributes allowed him to overcome the opposition of sawmillers and settlers. His amendment to the State Forests Act in 1919 was a deceptively simple measure by which, and mindful of scarce labour and financial resources, he was able to change the balance in land use allocation procedures. No longer did forested land have to be justified as suitable for State Forest reservation. Instead the onus was upon the Lands Department to prove that such lands were viable for settlement.

Hutchins' reports were the most technical, financially sophisticated, comprehensive and influential to that date. They also mirror fairly accurately forestry management practices fairly typical of the day. Albeit with some exceptions, Hutchins did not discount the possibility of introducing elephants into New Zealand to serve as beasts of burden in forestry work (Hutchins, 1918, 42-43). Hutchins typified the emerging professional forester, gaining in stature and influence in the early twentieth century. Hutchins, report did not, however, go uncriticised by North American foresters. One reviewer took him to task on two points: haste and the data base:

> "that a man of the reputation and ability of Mr Hutchins has found it necessary to publish what is obviously a hastily written book"

and:

> "the almost complete lack of definite data in which the glowing picture of the future is based, with the trumpet call for New Zealand to undertake forestry under the promise of securing wonderful results."
>
> (E, 1920, 635-636)

These criticisms, especially the latter, cannot be totally dismissed, but are perhaps more indicative of the emerging North American forestry fraternity no longer looking toward Europe as leaders in forestry practise. However, these internal frictions should not be allowed to obscure the emerging influence of the professional forester in landuse management. By 1919 forest policy in New Zealand had been reoriented towards indigenous sustained yield management. Implementation of this policy was the next stage.

CHAPTER VIII

INDIGENOUS TO EXOTIC FORESTRY: LEON McINTOSH ELLIS AND THE STATE FOREST SERVICE

8.1 INTRODUCTION

By 1920, through the efforts of David Hutchins and interest of Sir Francis Bell, New Zealand was poised on the threshold of a third move toward state forestry, one that was successfully initiated unlike its two nineteenth century antecedents. This chapter examines the establishment and first decade of State Forestry in New Zealand to 1930.

The substantive material included in this chapter has a dual focus. Firstly, the transition of the forest service from administrative independence, achieved by Bell in 1919, to completely autonomous status under a separate Forests Act. Secondly, the development of forest policy under Leon McIntosh Ellis, the first Director of Forests (1921-1928). Ellis produced a comprehensive report on forest conditions in New Zealand (AJHR, 1921, C3A) which laid down a national forest policy largely shaping both the form of the Forests Act, 1921-22 and composition of the State Forest Service. Although Ellis fully intended to develop forestry in New Zealand along orthodox lines of indigenous forest demarcation and sustained yield rotation as favoured by Hutchins (see Chapter VII), his reappraisal of the situation by the mid-1920s led him to concentrate efforts on exotic afforestation. This represents a significant departure from usual forestry priorities which tended to focus on managing natural forests. As a result the character of New Zealand forestry and its future course was altered radically.

In another instance the longer term effects of Ellis' policies were unexpected and less successful. Concerned to secure control of

all forested lands under the State Forest Service to achieve coordinated use, he opened in later years a breach between conservationists (of the utilitarian type) and preservationists. This split, which occurred in the United States in the 1890s, was most visibly manifest in the dispute over Waipoua kauri forest which was not resolved until 1952. The 1970s and 1980s have seen a continuance of these protests as pockets of indigenous forest became scarcer.

Two thematic issues arise from the substantive concerns of this chapter: 1. environmental perception and 2. the relationship between key individuals and the wider social and economic environment. The role of environmental perception and attitude in decision making is particularly well illustrated by Ellis' initial forest policy and its sudden reorientation. Although Ellis described his policy proposals as specially developed for the New Zealand situation, they were in fact largely derived from conventional North American and European forestry practice. More peculiarly antipodean elements were added through new appraisals born of greater experience of the special character of the New Zealand forest environment. Over some issues Ellis was less receptive to modifying his ideas and it was only with considerable reluctance that he gave up hopes for stock grazing as a part of state forest management.

Another example of a more acute perception of the New Zealand forest environment was the increasingly important role played by specialized technical knowledge. Specialists, such as foresters, made a greater input into decisions over forest policy. While the informed comment of the foresters was essential to implementing any systematic forest management procedures, their technical knowledge became increasingly difficult to communicate to administrators. Even to Bell, awake to the problems of forestry, Ellis had difficulty

justifying expenditure on scientific research.

The role of individuals, key events and the wider social and economic environment has been considered in previous chapters. It is fitting to do so again and especially appropriate for Ellis was successful where Campbell Walker and Kirk were not. In attempting to unravel the competing claims of Ellis (and Bell), the opportunities offered by key events and wider circumstances such as the world economic depression provide a clearer understanding of the progress of forestry in New Zealand during the 1920s.

8.2 LEGISLATIVE INDEPENDENCE FOR FORESTRY

The Forest Branch of the Lands Department was initially headed by Edward Phillips Turner, formerly Inspector of Scenic Reserves. Turner, who had no formal forestry training, voluntarily relinquished his position after less than twelve months in 1919, in favour of a trained forester. The appointment of a professional forester to the position of Director of Forestry was the first step towards a new forests act and legislative independence of forestry from the Lands Department.

Hutchins (1916a, 1919) the British forester, resident in New Zealand since 1915 had earlier been critical of the Royal Commission on Forestry for favouring an advisory board system over the appointment of a trained forester. However, Sir Francis Bell in his policy statement of 1919 accepted this need. He also recognised that this level of expertise was not available within the Dominion. Accordingly, in 1919, advertisements were placed in the United Kingdom, Canada and the United States, "for a man who has graduated at a recognised school of forestry, and has also had experience in the management of forests" (AJHR, 1919, C3, 8).

In all there were eighteen applicants for the position of Director and forty eight for Chief Inspector. The ages, professional qualifications and work experience of the top ranking five applicants are summarized in Table 8.1. The antipodean preference for "practical" men, a legacy of recent "frontier" experience shows through in the profiles of the preferred applicants. Indeed Douglas Keddie who was ranked first equal amongst the applicants had no formal forestry qualifications, but considerable experience with the forests section of the Bombay Burmah Trading Company. Of the others Hopkinson and Ellis had university forestry qualifications and considerable practical experience.

Interestingly, the position was not filled by either of two applicants but by Leon McIntosh Ellis, a young Canadian forestry graduate with public and private sector work experience in Canada and Britain. It is unclear to whom the position was offered and whether the favoured candidates declined the post. In all events Ellis' appointment was to shape the orientation of state forestry in New Zealand.

Of Ellis' qualities, his professional qualifications and employment history are fairly accessible from his application form (F Applications for Director of Forests) and obituary notices (eg. Anon, 1942). They reveal a sound professional background and a range of work experience. For instance, as Assistant Superintendent of the Forestry Department of Canadian Pacific Railways he was responsible for forest management, protection and utilization, silviculture, forest botany and forestry economics. Some elements of his work experience appear to have moulded his New Zealand forest policy (see section 8.3).

The most important quality was that of character and personality. From a range of sources during various stages of his career, including his application for the position of director, official reports and

Table 8.1

TOP APPLICANTS FOR THE POSITION OF DIRECTOR OF FORESTRY

Rank	Applicant	Age	Qualifications	Experience
1	Douglas Keddie	48	No formal qualifications	16½ years in Forestry in Burma and Thailand
2	Andrew Hopkinson	31	BSc, Royal Saxon Forest Academy	10 years Chief Inspector of Forest School (Forest of Dean). Staff of Director of Forests BEF France. Lecturer in Forestry, Royal Agricultural College
2	Leon McIntosh Ellis	32	BSc (For) Hons University of Toronto	13 years work experience including Laurentine Pulp and Paper Company, Lands Department of Ontario, Canadian Pacific Railways, Advisory Forest Officer to Board of Agriculture for Scotland
4	Ernest Sloane	59	Diploma of Forestry (Dehra Dun)	29 years. Assistant Conservator of Forests in India

Source: F Applications for Director of Forests.

file memoranda as Director of Forests, and the assessments of contemporaries, a picture of Ellis as a direct, confident, even brash young man emerges. In his application he wrote,

> "I regret (my) inability to produce testimonials, as until now, such documents have never been required."
> (F. Application for Director of Forests)

He did provide extracts from letters of former employers. He claimed that his "achievements demonstrate, I think, creative ability; initiative; leadership and clean aggressiveness" (F. Application for Director of Forests). Ellis preferred to see himself as "doing" rather than "going to do". This practical orientation and direct, sometimes colloquial approach to publicizing forestry met with success in his new environment.

Contemporary accounts present a picture of Ellis as a colourful and strong personality. Alexander Entrican, a forest engineer appointed to the new department in 1921 and subsequently Director of Forests from 1939-1960, referred to Ellis as "unorthodox" and,

> "a man of imagination, inspiration and of great drive and enterprise very impatient of red tape."
> (Entrican, 1963, 9)

Similarly on the occasion of Ellis' resignation as Director of Forests in 1928, Te Kura Ngahere, the forestry journal of the Canterbury College School of Forestry, lauded:

> "His intense energy, boundless enthusiasm and determination (which) were vital factors in building up in a very short space of time, from very small beginnings, an efficient forestry organization"
> (Anon, 1928, 36)

There seems to be little doubt that Ellis was responsible for instilling a spirit of unity and purpose into the fledgling State Forest Service. His personality and character, a peculiar blend of resistance and flexibility were also important to the orientation of forest policy.

8.2.1 The Forests Act, 1921-2

One of Ellis' first actions as Director of Forests was to familiarize himself with the existing situation and present a report embodying his recommendations (AJHR, 1920, C3A). This document provided the basis of the Forests Act 1921-2 and the organizational structure for the State Forest Service. Allsop referred to Ellis' report as "a masterly review of the situation and an exposition of the forest policy he recommended" (Allsop, 1969, 5). It is however in parts repetitive and at times betrays the sometimes colloquial bluntness of its author.

In a memorandum to Bell accompanying the report, Ellis emphasised that his document provided a policy designed for New Zealand needs. In fact in some of his later actions as Director of Forests, especially with regard to exotic afforestation he departed from his initial design. He also emphasised in 1921 that his policy was a "practical policy" which would achieve efficient resource use thus filling a neglected area and meeting the timber famine.

The report reviewed the New Zealand situation, considering the forest resource base, timber consumption levels, and the area of forest. In essence Ellis argued that the nation's timber supply amounted to 35-60 000 000 superficial feet and that within a generation annual consumption would reach 1 000 000 superficial feet. Thus all forest on lands unsuited for settlement should be placed on a sustained yield basis. The much vaunted and ever impending world wide timber famine required New Zealand to meet its timber supply needs internally. The orthodox policy that Ellis put forward in 1920 contained:

1. a simple forest act
2. a forest service
3. a forest development fund for forest development and demarcation

4. a progressive timber sales policy

5. adequate facilities for technical education

6. State cooperation in private tree growing

7. the administration of Scenic Reserves, National Parks and forested Crown land by the forest service

8. a forests products laboratory

9. a survey and inventory of forests, and soils of New Zealand

10. an economic survey of the timber industry and timber using industries

11. the administration of fish, bird and game resources by the forest service.

Ellis was successful in having most of his policy accepted. To a large extent his 1920 report served as a baseline against which he judged progress in forest management.

In 1921 the Forest Bill was introduced into the House of Representatives by the Hon. David Guthrie[1] the Minister of Lands. Its seven sections covered administration, state forests, licences leases and permits, financial provisions, offences, Maori forests, and miscellaneous items. The Bill was subsequently referred to a joint committee of both houses of parliament (Le 1/1922/5). Witnesses appearing before the joint forestry committee included representatives of two advocacy groups: the New Zealand Forestry League, and the Federated Dominion Sawmillers. Ellis also appeared before the committee and was questioned principally on the qualities of exotic forest trees. This reflects the persistent popularly held "tree planting" image of forestry. This view had been officially expressed in the early twentieth century, before Hutchins' reports restored

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1. It was acknowledged that Bell was the political driving force benind the legislation. As he was a member of the Legislative Council, the Bill was introduced into the House of Representatives by the Minister of Lands.

indigenous forest management to prominence (see Chapter VII).

The bill in its final form encompassed most but not all of Ellis' proposals. A department of state under a minister, entitled the Commissioner of State Forests was established. The Department was to be administered by a Director assisted by a Chief Inspector and Secretary while Forest conservators headed regional administration. These were based on land districts boundaries until 1929 when new Forest Conservancy Districts were defined. The administrative structure proposed in the Bill was the first of three forms proposed by Ellis and was modelled on Schlich's (1918), one of the doyens of Anglo-Indian forestry, suggestions for New Zealand and the French, German and some Canadian provincial forest departments.

Under the terms of the 1921-2 legislation the State Forest Service was charged with six major functions:

1. control and management of all matters of forest policy
2. control and management of permanent and provisional state forests
3. the planting and maintenance of nurseries
4. the enforcement of leases, permits and licenses
5. the collection and recovery of rents, fees and royalties
6. general administration of the forests act.

Working plans were required for State Forests and were to be the means by which sustained management of the forest service was to be achieved. Other provisions drawn directly from Ellis' report included the designation of fire districts to aid in the protection of forest resources and a tighter timber policy to reduce wasteful conversion of standing to sawn timber.

Ellis' proposals were not however accepted in their entirety. His desire for consolidation of the administration of scenic reserves,

national parks and Crown forest lands under the Forest Service did not appear in the draft Bill. During the debate on the Bill several members including William Veitch and Apirana Ngata spoke in favour of such an amalgamation. Veitch argued for scenery preservation and production forestry on the same grounds:

> "There is no reason why certain areas of land that have been set aside as scenic spots should not at the same time be used for the production of timber through the Forestry Department"
>
> (NZPD, 1921, 401, 497)

Bell, however was more perceptive and recognised from experience the incompatabilities of production forestry and scenery protection:

> "When I was appointed Commissioner of Forests I was also appointed Minister in charge of Scenery Preservation, but after I had held these two positions for a year I discarded the office of Minister of Scenery-Preservation because I found it absolutely inconsistent with the Ministry of Forestry"
>
> (NZPD, 1921-2, 193, 568)

Several clauses of the original bill were modified or removed during its passage. Two of these, clauses 20 and 21 stated that provisional state forest not revoked within five years of designation became reclassified as permanent State Forest. The removal of these clauses may be regarded as a further episode in the land settlement versus forestry conflict. Again the strongly agriculturally oriented Massey government favoured settlement interests. Ngata was one who criticised this stance:

> "In the past the interests of the settler have been dominant. He was the pet of all governments because he had a vote, and he still has. Every year one has seen our forests reduced by sundry proclamations"
>
> (NZPD, 1921-2, 193, 511)

On the whole however, land settlement had peaked and in the 1920s Ellis did not face the acute competing and dominant demands upon the forest estate that confronted Kirk and Lands Department administrators in the

1880s and prior to 1914.[2]

Despite stopping short in some of his proposals, the Forests Act satisfied Ellis. In 1922 he wrote that it "expresses the best of modern experience in the administration of national forests" (AJHR, 1922, C3, 2). The Forests Act wholly freed forest administration from the Lands Department for the first time since Kirk's brief episode of 1886-1889. During the 1920s Ellis guided the progress of forestry in New Zealand with enduring results.

8.3 L. McINTOSH ELLIS: DIRECTOR OF FORESTS 1921-28

As Director of Forests, Ellis was instrumental in orienting forestry operations in New Zealand. His position, personality and training led him to devise a forest policy that was initially based on orthodox indigenous management. Later new evidence persuaded him to boldly redirect efforts toward exotic afforestation. However while Ellis was a leading actor, he was not completely dominant. For instance, he faced persistent opposition from the Dominion Federated Sawmillers while exogenous economic factors such as the ruling price for timber and later world economic depression were beyond his control. However, he was in a position to respond to a range of external and internal political and economic fluctuations. Thus by virtue of his position as Director, Ellis was the key individual in the implementation of forest policy during the 1920s.

Ellis' extensive range of interests may be for convenience examined in three groupings:

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2. The revocation of State Forest lands continued throughout Ellis' directorship as the number of parliamentary motions indicates: 1 in 1922, 1 in 1923, 3 in 1926, 8 in 1927, 6 in 1928. However Bell's Forests Amendment Act, 1919 now placed the onus on the Lands Department to show that these areas were suitable for settlement.

1. regulating the Timber Industry
2. managing the Forest Resources
3. research and Education

Although in practice there were important crosslinks between the three sectors.

8.3.1 Regulating the Timber Industry

The regulation of the timber industry had an internal and an external dimension. Ellis' contribution was to change the internal structure of timber selection and sales with the dual aim of increasing state revenues and efficiency of conversion from standing to sawn timber. The second dimension, championed earlier by Bell, involved seeking the prohibition of indigenous timber exports. The rationales for this course of action were to prevent actual shortages on the New Zealand market and to prevent high overseas timber prices driving up local market prices.

By 1923 Ellis made reference to pressure from sawmilling interests to return to the timber sales system that had prevailed since the 1870s. In most areas timber revenues had continued to be assessed off the sawn output rather than on a standing estimate and sawmillers had a large say in defining the boundary of their licensed areas. The essence of Ellis' reforms was the replacement of royalty payments on output with standing block timber sales by tender. Ellis considered this system was both more efficient in minimising waste in conversion and fairer to the timber industry. In 1926, he clearly reiterated the four aspects of his timber sales policy (AJHR, 1926, C3). These were:

1. the desire to provide continuous and stable supplies of timber for established industries and local users
2. the initiation of sawmilling in forest regions where it was justified in the public interest

3. protecting the community from timber monopolists
4. disposal of timber in such a manner that prevented speculation and profiteering.

Social as well as purely economic concerns are evident in these four rationales for the internal timber policy.

The sawmillers however were unhappy with Ellis' reorganization which had caused standing timber prices to rise and placed tighter controls on the amount of timber securable. Most discontent was centred on the tender system. Sawmillers considered that they were "being singled out for unreasonable and even unfair treatment" (Ward, 1967, 30-31). Sale by auction could be concluded on the spot, but sale by tender usually took several months to resolve. Their greater fear was that tenders placed sawmillers at the mercy of speculators, which meant that the energy and enterprise expended in providing access to new areas might not be rewarded. A single tender system allowed no second chances. Ellis, and subsequent Directors of Forestry, considered that the auction system favoured by the sawmillers was equally vulnerable to abuse and resisted all efforts to depart from sale by tender.

Further opposition came from local bodies, who, under the new legislation, found themselves deprived of a source of revenue formerly obtained from timber licence sales. Ellis was unmoved and emphatic in his opinion that national resources were not for the purpose of financing local bodies. Similarly the mining wardens, who previously had "exercisable" and "granted" rights under the mining act to issue timber licenses lost this privilege through an amendment to the Forests Act in 1926 (Foster, 1936). This was another example of Ellis' determination to place forest management under a single government agency.

Ellis' unyielding response to the sawmillers was sufficient to cause Prime Minister Massey concern. Bell, however, had full confi-

dence in Ellis and threatened to resign if the policy was changed. What did Ellis hope to gain by being so unyielding? He explained to the sawmillers that,

> "His task was to make sure the State received the 'unearned increment of the forests', which he felt could be better achieved by tender than auctions"
> (Ward, 1967, 44)

The restrictions on exporting indigenous timber allowed existing contracts to run down so that the quantities exported dwindled throughout the period (Table 8.2). This strategy was pursued to ensure that New Zealand timbers were utilized locally. A comparison of the 1921 and 1931 totals suggests a successful winding down of timber exports with a reduction of 38 percent in total exports over the period. Kahikatea, the dominant species exported, was reduced by 1931 to 47 percent of the 1921 totals. Equivalent figures for rimu and kauri were 12 percent and 17 percent respectively.

In 1928 persistent pressure from the sawmillers was rewarded with a relaxation of restrictions causing a 4 000 000 superficial foot increase in exports (Table 8.2). This is reflected in the higher percentage of total production exported in that year. The government's reasons for allowing increased exports[3] were to clear a local accumulation of timber and as a means of easing unemployment in the industry. Bell was no longer the minister in charge, but had retained his concern for forestry and was dissuaded from resigning from Cabinet only when the Commissioner of Forests made a public statement that this was only a temporary expedient measure and the policy of restricting timber exports remained.

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3. It is interesting to speculate whether the decision to allow increased timber exports brought about Ellis' sudden resignation as Director of Forests in 1928. Nothing conclusive emerged from the author's research other than evidence that Ellis was preparing to remain in New Zealand. His term as Director of Forests had only recently been renewed for another three year term and he had accepted the office of President of the newly founded New Zealand Institute of Foresters. Yet within months he had resigned and shifted to Australia to work as a forestry consultant.

Table 8.2

TIMBER EXPORTS AS A PERCENTAGE OF TOTAL PRODUCTION

1921-1931

Year	Quantity Exported (superficial feet)	Percentage of total production exported
1921	45 902 627	14.9%
1922	44 186 848	14.0%
1923	47 570 490	15.6%
1924	42 928 726	13.5%
1925	50 263 186	14.6%
1926	40 465 221	11.5%
1927	37 147 798	12.2%
1928	35 028 332	13.0%
1929	39 102 831	14.5%
1930	26 676 131	9.4%
1931	17 532 304	7.6%

Compiled: New Zealand Year Books.

The timber sales policy established by Ellis endured and the restrictions on exports lasted during his term as Director. Regulation of the local industry to prevent waste and provide revenue to the state as well as filling home demand first was only one part of the overall policy. The management of the forest resources of the Dominion provided the setting for his most creative administration.

8.3.2 Managing the Forest Resource

Ellis set out to assess, then acquire and manage the indigenous forest resources of New Zealand. The initial resource assessment was undertaken through a natual forest inventory which guided the acquisition and demarcation of forestlands. Management procedures based upon the initiation of fire control, sustained yield forestry and recreation and game control were then put into operation. There were difficulties in this regard, but Ellis came to terms with his new bio-physical environment and the limitations of indigenous forest resources imposed by likely future demands, and initiated an extensive programme of exotic afforestation.

The National Forest Inventory

The National Forest Inventory 1921-1923 was the first detailed systematic appraisal of all the forest resources of the Dominion. The inventory was concerned with assessing the quality and quantity of forest growth, the extent of fire damage, and its causes, the effects of grazing, regional distributions of forest types and to examine the relationship of forested watersheds to lowland water resources. In Ellis' view the inventory was the essential baseline on which plans for forest acquisition and demarcation, fire control and sustained yield management depended.

The forest inventory revealed that 12.5 million acres or nearly 20 percent of the Dominion could be classified as forest land (Table 8.3). Of this only 5.6 million acres was merchantable forest. A breakdown of the quantities and composition of milling timber was also obtained (Table 8.4). The inventory revealed that nearly two thirds of the timber resources were soft woods with rimu the dominant species. Beeches similarly dominated the hard woods. The National Forest Inventory was compiled with "considerable reliance on eye methods" (Masters, et al 1957, 6). The potential for error was recognized but the personnel and techniques required for a more thorough inspection were unavailable. However, a sufficiently detailed regional breakdown of forest resources now existed for Ellis to put his management schemes into operation.

Forest Acquisition and Demarcation

The results of the National Forest Inventory further encouraged Ellis to place as much forest land as possible under the control of the State Forest Service. He carefully justified himself with respect to the agricultural or sawmilling interest. "It is recognized", he wrote, that,

> "forests were made for man and not men for forests and the coordination therefore, necessary between the settlers interests and those of the sawmillers and other uses of forest products will be carefully balanced"
> (AJHR, 1924, C3, 12)

An address to the Agricultural and Pastoral Association Conference is further evidence of efforts to avoid antagonising the agricultural interests of the country (Ellis, 1920).

During Ellis' directorship Permanent State Forests increased by 17 percent to nearly 2 000 000 acres and Provisional State Forests by 42 percent to over 5 500 000 acres (Figure 8.1).

Table 8.3

NATIONAL FOREST INVENTORY 1923, LAND CLASSIFICATION

Category	Area (acres)	Percent
Land suitable for agricultural and pastoral purposes	40 687 019	61.8
Forest land	12 592 811	19.1
State Plantations	44 610	0.1
Non productive (above and below the timber line)	10 692 423	16.2
Lakes, Roads and Rivers	1 847 737	2.8
Totals	65 864 600	100.0

Source: New Zealand Year Book 1927.

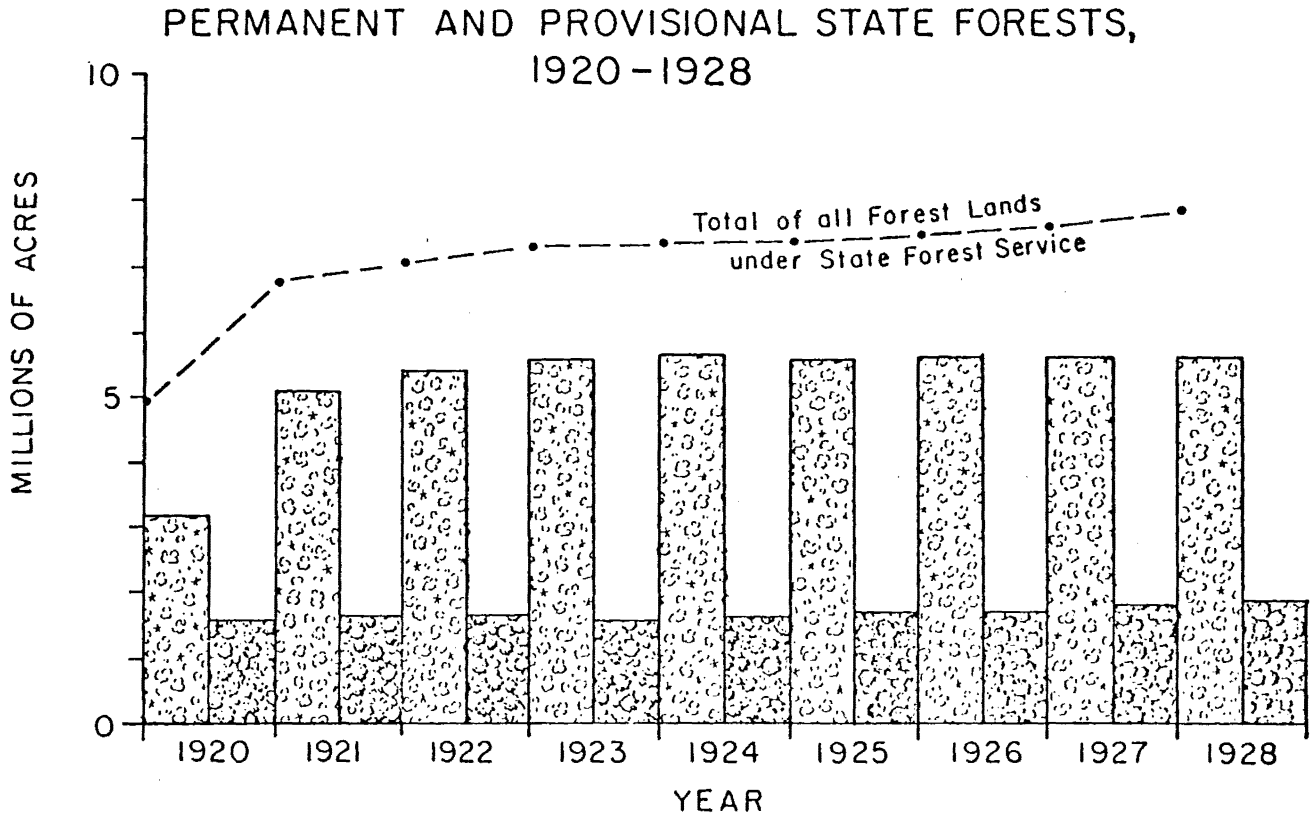
Table 8.4

NATIONAL FOREST INVENTORY: MILLING TIMBER SUPPLIES

Woodtype		Millions (board measure)	Percent
Softwoods:	Kauri	368.6	0.6
	Totara	3 176.1	5.1
	Rimu	28 074.6	45.2
	Kahikatea	3 054.5	4.9
	Matai	2 617.7	4.2
	Silver Pine	334.4	0.5
	Miro	854.1	1.4
	Kaikawaka	398.0	0.7
Total Softwoods		38 870	62.6
Hardwoods:	Beech	20 311.7	32.7
	Tawa	2 875.9	4.7
Total Hardwoods		23 187.6	37.4
Total Milling timber		62 065.6	100

Source: New Zealand Year Book 1927.

Figure 8.1



AJHR, C3

Although considerable gains in acreage had been made, Ellis was not entirely satisfied with the situation:

> "The wide disproportion between permanent State Forests and provisional State Forests must be corrected. For it is evident that at least 5 000 000 acres of provisional acres comprise lands chiefly valuable for forestry and not for agriculture or settlement"
> (AJHR, 1924, C3, 4)

The predicted future levels of demand for sawn timber made it imperative in Ellis' eyes that all forest lands be placed under State Forest Service jurisdiction and thereby utilized as production forests or serve as protection forests. The provisional forest designation, although it now placed the onus on the Lands Department to justify opening forest land for settlement, was too insecure in status to be part of Ellis' plans for sustained yield rotational forestry.

Fire Control

The organization of a fire control system was a task that Ellis undertook in conjunction with the forest inventory and attempting to achieve sole State Forest Service jurisdiction over forest lands. Whereas the inventory provided the basis for planned management which would be facilitated by State Forest Service administration, the fire control programme was intended to physically protect the resource base.

Fire was the commonest means of land clearance in nineteenth and early twentieth century New Zealand. Lady Barker, the wife of a Canterbury runholder had written to Britain of "the exceeding joy of burning" (Barker, 1870). Ellis estimated that two and a half million acres of virgin forest land had been burnt in the preceding generation. Indeed 50 000 acres of Crown forest land valued at £1 000 000 was burnt in 1921 (AJHR, 1921, C3, 7). The lack of apparent concern shocked Ellis:

> "Your Director is appalled at the apathy and indifference displayed by this wanton destruction, apparently 'what is everybody's business is nobody's business"
> (AJHR, 1921, C3, 7)

Destruction of this magnitude led Ellis to identify fire as the "arch enemy" of successful forestry and "the single most important technical problem that the State Forest Service has to deal with" (AJHR, 1922, C3, 8).

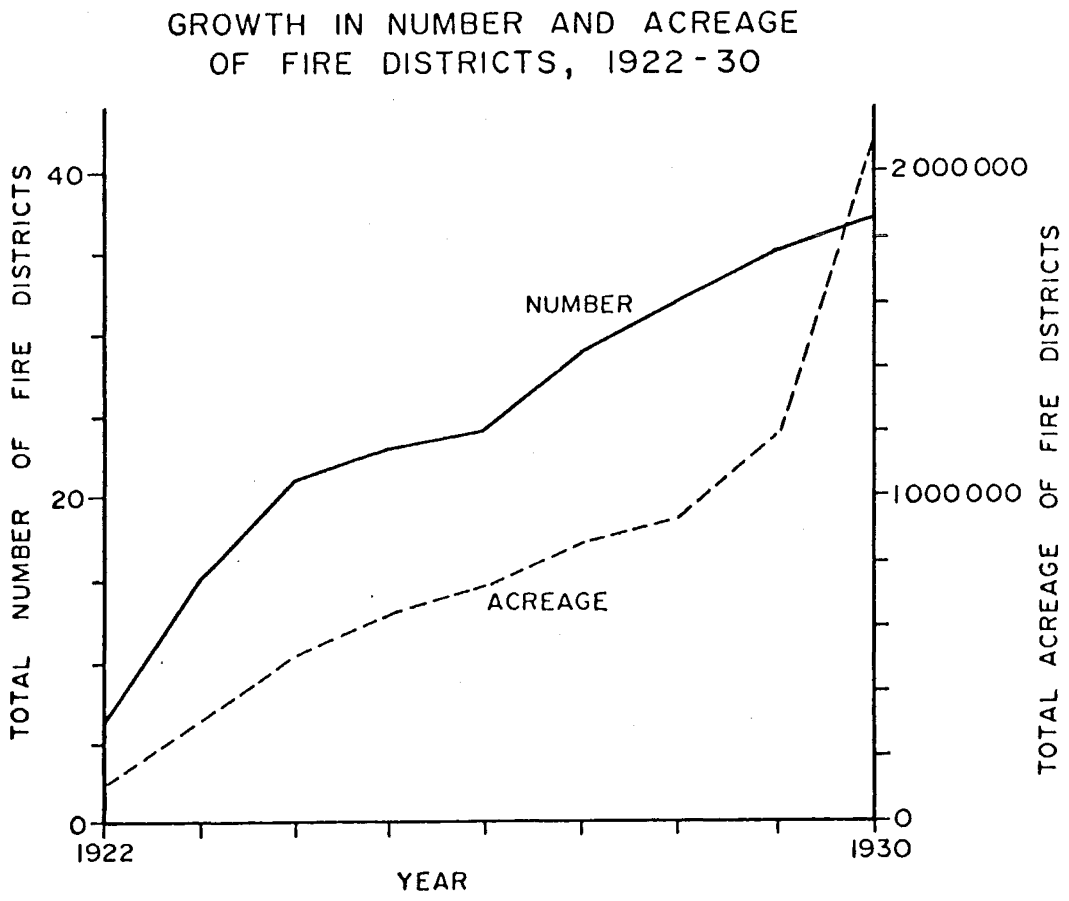
Still relatively unfamiliar with the New Zealand environment, Ellis believed overseas forestry principles could be implemented with little difficulty. The fire problem, however, he quickly identified as a peculiar dimension of forest management in New Zealand and outside his previous experience:

> "The primitive taxad timber trees of New Zealand are much more susceptible to death and damage by this agency than are modern types of conifers and for that reason our activities must be much more complete than in countries of the Northern Hemisphere"
> (AJHR, 1922, C3, 8)

Ellis was astute enough to realise that successful fire control required more than statutes and regulations but depended upon "public forest consciousness and the appreciation of the forest as a tangible asset" and not "something to be gotten rid of at the earliest possible moment" (AJHR, 1922, C3, 8).

The Forests Act 1921-2 made provision for the establishment of Fire Districts. These were areas specially constituted for the purpose of preventing forest fires. In these zones closed seasons on fire lighting were used to reduce the hazard, honorary rangers policed the districts and all males over sixteen years working in the area could be called upon to aid in fire fighting duties. Five fire districts were gazetted in 1922, and the number had grown to nearly forty by 1930, amounting to a combined area of in excess of 2 000 000 acres (Figure 8.2). The largest number of Fire Districts occurred in the Auckland and Otago Land Districts. Only in Westland, a region of high

Figure 8.2



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rainfall, were none in existence (Table 8.5).

Throughout the 1920s the Fire Districts system successfully curtailed the loss of merchantible timber to fire (Table 8.6). A few acres rather than tens of thousands of acres of merchantible forest were lost as had occurred in earlier years. Only in 1928 were fire losses significant. With the forest resource accounted for and protected from fire damage, Ellis was able to make preparations for sustained yield management of the indigenous forest.

Sustained Yield Forestry

From the first Ellis stated that one of the aims of the State Forest Service was the "rational control of forest exploitation to secure constant renewal and perpetuation of the resources" (AJHR, 1921, C3, 7). The essence of implementing sustained yield forestry, that is when the forest increment is harvested on a rotational basis, is the working plan (D'Arcy, 1910, 15).

Working Plans were specifically called for in the Forests Act of 1921-22. In this instance they were modelled on Western Australian legislation (McKinnon, 1957,8). However the task of completing the National Forest Inventory, the necessity of securing as much remaining forest land as possible under State Forest Service control, and the need to institute effective fire protection slowed the introduction of indigenous working plans. Thus in his 1925 quinquennial review of operations, Ellis recorded his disappointment:

> "careful analysis of the results accomplished during the period ... will indicate that only an insignificant part of the national forest policy has been laid"
> (AJHR, 1925, C3, 6)

In fact the first steps towards preparing working plans were not

Table 8.5

FIRE DISTRICTS BY LAND DISTRICT

1922-1930

Land District	Number	Area (acres)
North Auckland	4	11 079
Auckland	8	1 057 275
Taranaki	1	?
Hawkes Bay	1	6 610
Wellington	5	243 860
Nelson	4	208 750
Marlborough	1	44 650
Westland	-	-
Canterbury	5	140 390
Otago	7	245 615
Southland	2	117 200
Total	37	2 075 429

Compiled: New Zealand Gazette.

Table 8.6

STATE FOREST FIRE STATISTICS 1921-1928

Year	ORIGINS OF FIRES[1]. Sawmill operators	Travellers, Trappers and Sports	Land Clearing	Unknown	Merchantible Timber Lost Acres	Value £
1922	6	0	4	3	1½	111-10
1923	1	5	2	5	2¼	11
1924	6	2	11	14	45	272-15
1925	5	1	-	6	26	60-15
1926	4	4	2	4	41	76
1927	-	-	4	9	1	12
1928	5	18	5	6	4353 3/4	3725-6-10

Source: AJHR, 1922-28, C3.

Notes:

1. Comparative Statistics of this level of detail are not available for pre 1920 although a return of forest reserves for the Nelson Land District (AJHR, 1903, C13B) indicates considerable acreages had been burnt.

taken until 1929,[4] after Ellis' departure (McKinnon, 1957, 12). In part however, this delay in instituting working plans and sustained yield management, the crux of the 1920 report, was due to other circumstances which Ellis felt could best be met by a radical reorientation toward exotic afforestation. The first scientific forestry investigations (see section 8.3.3) also contributed in some small but significant way to this decision.

Recreation and Game: Alternative Forest Uses

Ellis encouraged recreational use of State forest lands. In doing this he embraced an early multiple use approach to forest lands. However there are both resistant and malleable aspects of Ellis' policies with regard to recreational use, introduced deer and opossums, stock grazing and indigenous birdlife.

Recreational use of forest lands by tourists, trampers, hunters and fishermen increased throughout the 1920s as the motor car increased the mobility of the population (Table 8.7). Ellis deliberately encouraged a view of the "natural forest domain as a people's playground" (AJHR, 1922, C37). To this end he circularized his staff reminding them of aesthetic considerations when demarcating areas for timber sales:

> "Generally wherever the forest or woods have a potential scenic or amenity value every consideration should be given by the responsible officer in preserving these assets from exploitation or destruction by exploitation"
> (Director of Forestry, Circular No 26, 1921)

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4. The plans for rotational kauri forest management devised by 1940 were subsequently frustrated by the Waipoua forest dispute which pitted preservationists against conservationists. See section 8.4.

Table 8.7

NUMBER OF MOTOR VEHICLES REGISTERED IN

NEW ZEALAND 1926-1930

Year	Number of Motor Cars	Number per Capita
1925	71 403	19.4
1926	92 813	15.2
1927	106 091	13.6
1928	117 796	12.4
1929	135 487	10.9
1930	150 571	9.9

Source: New Zealand Year Book, 1932.

This circular further suggests that Ellis believed it was possible to reconcile satisfactorily the competing demands of timber utilization and scenery preservation.

In Ellis' view alternative forest uses extended beyond solely scenic attributes to include recreational hunting of deer, commercial opposum trapping and cattle grazing. In his 1920 report Ellis wrote of deer in a favourable light, possibly because they were a natural part of the forested environments that he was familiar with. He did however, on the basis of his time in Scotland, express reservations that over population could cause problems. Over the following years as Ellis' understanding of the New Zealand environment increased so his attitude to deer hardened. In 1922 he perceived that environmental damage over extensive areas of both islands was occurring:

> "The introduction of exotic game has more or less upset the natural balance of a widespread area of State forest in New Zealand"
>
> (AJHR, 1922, C3, 7)

With damage amounting to £1 000 000, he regarded the situation as serious enough to declare "in some regions it is now a case of deer or forests" (AJHR, 1922, C37). A year later he declared the control of deer "vital to the progress of silviculture" (AJHR, 1923, C32). Others, including Pernam (AJHR, 1923, C3A) had reached similar conclusions although deer culling did not begin until 1929 (McCaskill, 1973, 179).

Concurrent with Ellis' recognition of the deer problem was his new realization of the importance of the indigenous birdlife to the forests, a theme he repeated on several occasions:

> "The conservation and control of wildlife within State forests has received serious attention during the period, for a very close and intimate relationship exists between the indigenous avifauna and the regeneration of the taxad or native pine forest."
>
> (AJHR, 1925, C34)

In other spheres Ellis was more resistant to adjusting his ideas to the new forest environment. Deer he rapidly assessed as detrimental, yet for several years he looked to stock grazing[5] as a means of removing inflammable undergrowth. Only with reluctance did he dispense with the idea when State Forest Service investigations proved that "grazing is progressively injurious to the forest according to its intensity and duration" (AJHR, 1925, C3, 16).

Ellis, perhaps again influenced by his North American background, enthusiastically predicted that the opossum, for its fur was "a great potential source of revenue" (AJHR, 1921, C3, 7). Needless to say he was concerned State forestry should show financial returns. Opossum liberations peaked at nearly one hundred during the decade 1920-1930 (Pracey, 1974, 6). However, although Ellis referred to a "growing feeling of antagonism towards the opossum in some quarters" (AJHR, 1924, C3, 7), he noted that this was not the view held by the State Forest Service.

In his policies with regard to deer, grazing, indigenous birdlife and opossum Ellis displayed varying degrees of perceptiveness in his appraisal of the New Zealand forest environment. Some aspects of his professional forestry training he adapted readily, other areas less so. His most radical reappraisal occurred with respect to the role of exotic forestry.

State Exotic Forestry

Ellis began his directorship with the orthodox view, shared previously by Campbell Walker, Kirk and Hutchins, that indigenous forestry was the central concern of the State Forest Service:

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5. This procedure was widespread in European forestry. Ellis did not seem to consider that by removing the undergrowth he would effectively prevent regeneration.

> "It is obvious that the problem of assuring the present and future timber supplies of this Dominion must be solved through the conservation re-establishment of forests in the indigenous forest regions, and not chiefly by the artificial formation of exotic-tree plantations"
>
> (AJHR, 1921, C3, 12)

The results of the National Forest Inventory and calculations of the annual level of timber consumption forced a re-appraisal in the mid-1920s. In 1924 Ellis noted that "forestry in New Zealand is at the crossroads" (AJHR, 1924, C3, 14). The official assessment was that in 80 years three quarters of the virgin forest would be gone.

The quinquennial review of forest operations in 1925 marked a turning point. Ellis predicted (with remarkable accuracy) that annual sawn forest consumption would be 675 000 000 feet (board measure) by 1965, which would effectively exhaust the resources by the same period. The ranges of options was limited, large scale substitution of timber products was not feasible, reliance on imports promised to be increasingly costly and created a dependence on overseas supplies which were regarded as diminishing, while large scale afforestation remained relatively untried.

Under the circumstances exotic afforestation, despite its problems, offered the only real solution. The pulls to exotic forestry outweighed the push away. Similarly new scientific perspectives on the indigenous forest pushed Ellis from them. Once Ellis accepted that the levels of timber consumption would not permit conventional indigenous forestry, his major reservations about exotics concerned their potential susceptibility to disease and the acceptance of the timber by consumers accustomed to high quality indigenous woods. His perception was that the advantages of afforestation outweighed these considerations. A solution to the timber supply problem existed in the fast growing exotics. Land suitable for forests but, because of an unrecognized cobalt deficiency,

unsuited to agriculture, was available in the central North Island (Allsop, 1969). The cost of establishing plantations had also been reduced from £26-18-3 per acre in 1918 to £1-19-8 per acre in 1925, thus eliminating one of the orthodox foresters' main objections to afforestation.

New scientific information about the nature of the New Zealand forest was also on hand and this may also have pushed Ellis away from his original confidence in indigenous forestry. Cockayne (1921, 133) using ideas of plant succession and climax argued that, "as for the kauri-forest, so with the taxad, there is no true stability." An American visitor, Professor E. H. Wilson of the Arnold Arboretum of Harvard University independently reached a similar conclusion (Cockayne, 1923). Wilson considered in perhaps 500 years broadleafed species would dominate the forest type. Foweraker's research in Westland also suggested the beech species were advancing into rimu forest, which formed nearly half of the timber resources in 1923 (See Table 8.4). A conclusion could be drawn from these studies that sustained yield rimu management would be impossible. This does not appear to have been explicitly spelt out at the time, although it was articulated by the early 1950s. After reviewing evidence supporting rimu as a relict forest type Thomson suggested,

> "Nor is there any evidence that the forester can hope to reverse the process of natural succession and induce rimu regeneration following logging, irrespective of the silvicultural system which may be used"[6]
> (Thomson, 1952, 7)

---

6. The relationship of man to nature evident in this statement differs considerably from the nineteenth century outlook where man was regarded as able to improve nature.

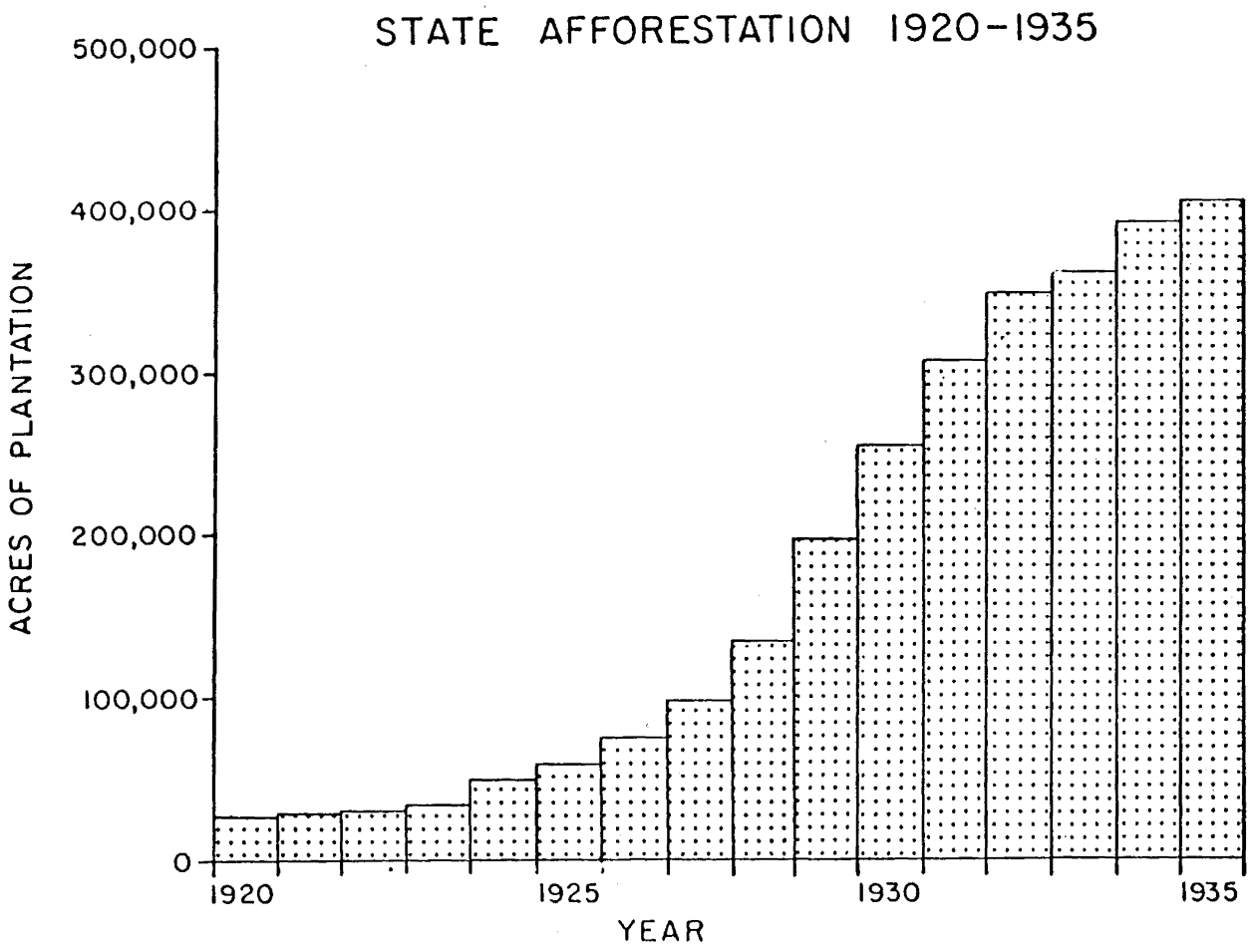
Cockayne's (1926) research, which suggested sustained yield beech forestry was possible, came after Ellis had committed the country to exotic afforestation. Besides, the beech forests alone could not provide for the national demand for timber.

In 1925 Ellis produced new forest policy recommendations:

> "At present there are 13 000 acres of State plantations. It is recommended that this acreage be increased to 300 000 formation to be completed by 1935."
> (AJHR, 1928, C3, 13)

This represented an enormous expansion of afforestation efforts from a previous level of about 2000 acres per annum to approximately 24 000 acres per annum if the goal was to be achieved. In fact the target acreage was surpassed (Figure 8.3). The majority of the planting was located in the central North Island. The programme benefited considerably from its approval as subsidised work for unemployed labour during the depression of the 1930s (Ellis, 1935). Afforestation by private companies also boomed during the 1920s and almost matched State operations in extent. Private plantations amounted to 213 200 acres in 1929, 94 percent of these were located in the cobalt deficient, than agriculturally deficient, lands of the central North Island. Thus the course of forestry in New Zealand had been turned Exotic afforestation, most often with readily available Pinus radiata (Weston, 1957) was the popular choice. A broad breakdown of acreages planted in various species is given in Table 8.8. This clearly shows the predominance of pine species within which Pinus radiata dominated, especially after 1925. Depsite rejection by forestry experts such as Hutchins exotic afforestation was officially sanctioned on a large scale in 1925. Ellis' reason for this about-turn was his conviction that the demand for forest products outweighed the ability of the indigenous resource base to provide them.

Figure 8.3



AJHR, C3

Table 8.8

FOREST SPECIES PLANTED, 1921-1926

Year	Pine Species (acres)	Fir Species (acres)	Other Softwoods (acres)	Hardwoods (acres)	Total (acres)
1921	1 812	1 532	32	32	3 408
1922	1 434	1 422	6	-	2 862
1923	4 129	3 067	12	-	7 208
1924	10 118	904	39	59	11 120
1925	12 811	3 040	65	48	15 964
1926	17 193	2 058	615	58	19 924
Total	47 497	12 023	769	197	60 486

Source: LE 1/1928/223.

8.3.3 Research and Education

Although Ellis regarded himself as a practical man of action, he was aware of the importance of longer term research and forestry training programmes. Thus he directed efforts towards initiating a contract research programme and departmental scientific investigations of the indigenous forests. He was also in favour of the establishment of a School of Forestry to provide a source of trained graduates for the State Forest Service. In this way knowledge of the forest environment and State Forest Service expertise could be increased simultaneously.

The National Forest Inventory of 1921-1923 provided a basic check list of forest resources. From the first Ellis sought to obtain more detailed scientific information on indigenous regeneration and growth rates as this was essential information for implementing any system of sustained yield rotational forestry. In 1921 he wrote to Bell arguing that in the past "instead of searching for the key to Nature's workshop", afforestation had been substituted as the solution to timber supply difficulties. In Ellis' opinion:

> "unless and till the foresters are in possession of a working knowledge of the phenomena of Nature as regards the basic laws of growth of the native forests, you will have no managed forests, no regeneration and no future supplies"
>
> (Ellis to Bell, 7.9.21, F6/1/13/1)

He was exasperated by the difficulties in funding this research when indigenous forestry was a "practical policy" and "one that will pay its own way instead of calling for £40 000 000 if the indigenous forests are thrown overboard and exotic trees planted" (Ellis to Rhodes, 19.10.22, F6/1/13/1).

Under difficult financial conditions, Ellis instigated departmental studies on a range of topics. These included plantings on an experimental station in Westland, sand dune stabilization work at Rangitikei,

indigenous and exotic growth rate studies on a number of sample plots and underplanting of conifers in native forests. Important work on indigenous growth rates and regeneration was undertaken on a contract basis at Auckland and Canterbury University Colleges (Table 8.9).

Foweracker's Westland research showed "the rimu is dying out where silver-pine is densest (which) seems to suggest that silver-pine is a successional forest following on rimu " (AJHR, 1924, C3, 10-11). Hutchinson (1926, 1927) completed a report on the forests of the Canterbury region, but by far the most important contribution was made by Leonard Cockayne, who had undertaken several botanical surveys for the Lands Department in earlier years (AJHR, 1907, C8A; 1908, C11; 1908, C14,; 1909, C12) and published an important monograph on the vegetation of New Zealand in 1921. He was in no doubt as to the value of scientific study to forest management:

> "If an accurate knowledge of any branch of New Zealand plant-ecology is of more importance for forestry than any other it will come from the study of succession"
> (Cockayne, 1928, 249)

The concepts of community, succession, and climax were also used by North American forest managers even though the forests typically displayed well defined age classes which ran counter to the theoretical distribution (Kaup, 1964). Scientific investigations greatly increased the knowledge about the indigenous New Zealand forests, but many questions remained unanswered.

Cockayne's work on the beech forests was intended to provide the information required to manage them on a commercial basis. He argued that the beech were a "climax plant-formation" of long persistence and self-replacing. By his calculation an 80-120 year rotation system would be required for their management. This he observed was comparable with those in European forests. Cockayne, as had Hutchinson and Ellis, also favoured indigenous regeneration as an economical solution.

Table 8.9

UNIVERSITY BASED FOREST RESEARCH IN THE 1920S

Researcher	Affiliation	Topic
McGregor	Auckland University College	Kauri and Northern forest ecology
Foweraker	Canterbury University College	Westland indigenous forests
Murray	Canterbury University College	germination experiments
Bennett	Canterbury University College	growth rate investigations
Cockayne	Honorary Botanist, State Forest Service	Beech forests
Hutchinson	Canterbury University College	Canterbury forests

However other aspects of Cockayne's work (Cockayne, 1921, 1923) may have played some part in convincing Ellis to shift to exotic afforestation as a solution to the timber supplies problem (see section 8.3.2). This reorientation had already taken place by the time that Cockayne's deliberations on the beech forests were published, in 1926.

The research of Cockayne and others produced a detailed understanding couched in scientific language of New Zealand's forest environment. Ellis regarded this work as essential for sustained yield indigenous forest management. The official scientific appraisal of the environment now reached new heights of importance. Scientists possessed greater knowledge of the workings of the natural environment yet, somewhat paradoxically, this was obtained at the expense of its communicability to the official and popular sectors. Political decision makers now had to accept the recommendations of the forest scientists without the ability to critically evaluate them. However political elements of decision-making remained ascendent, as for instance when timber exports were permitted despite Ellis' opposition.

A forestry school had been discussed and dispensed with during Vogel's initial period of enthusiasm in 1874. Under Kirk a site at Whangarei was chosen but government retrenchment prevented fruition of the scheme. Thomas Adams, a pioneer experimentalist with exotic species and member of the Royal Commission on Forestry on his death in 1919 left £2000 and a 98 acre plantation to Canterbury University College to assist in the establishment of a School of Forestry. Bell approached the University senate in 1921 to establish a forestry school. Charles Foweraker was appointed as lecturer in forestry in 1921 and Professor Chilton included forestry lectures in his Botany courses, but no separate School of Forestry was established until 1924. The delay is attributable to inter-university strife between Auckland

and Canterbury who both wished to have the School of Forestry (Gardner et al, 1973). An unsatisfactory compromise involving the establishment of two forestry schools was the result. This was much criticised by the Royal Commission on University Education of 1925, the British Empire Forestry Conference of 1921, and Ellis, who favoured a Canterbury College because of the presence of the Engineering School. Ellis' own university years were spent in the Faculties of Forestry and Applied Science (Civil Engineering) at Toronto and on occasions he referred to himself as a "forest engineer". Ultimately the economic depression forced the "temporary"[7] closure of the forestry schools.

The acceptance of the need for a School of Forestry, and even the inter-university college strife indicates a change in thinking. In nineteenth century New Zealand forestry was popularly identified as "tree planting" and foresters functions regarded accordingly. Even the Royal Commission of Forestry of 1913 dismissed the idea that forestry was a distinct science. By the 1920s the old argument that the practical skills of New Zealanders outweighed the theory of European trained foresters had faded. The suggestion that the New Zealand environment was in some way unique remained. To this end the forestry school sought to train graduates versed in local forest conditions. The Canterbury forestry school had a strong practical orientation to forest utilization with considerable field work in its course structure (Anon, 1927).

8.4 WAIPOUA KAURI FOREST: CONSERVATION VERSUS PRESERVATION

The 22 500 acre Waipoua kauri forest (Figure 8.4) since its purchase in 1876 illustrates in microcosm many of the themes that run throughout New Zealand forest history as a whole. At various stages

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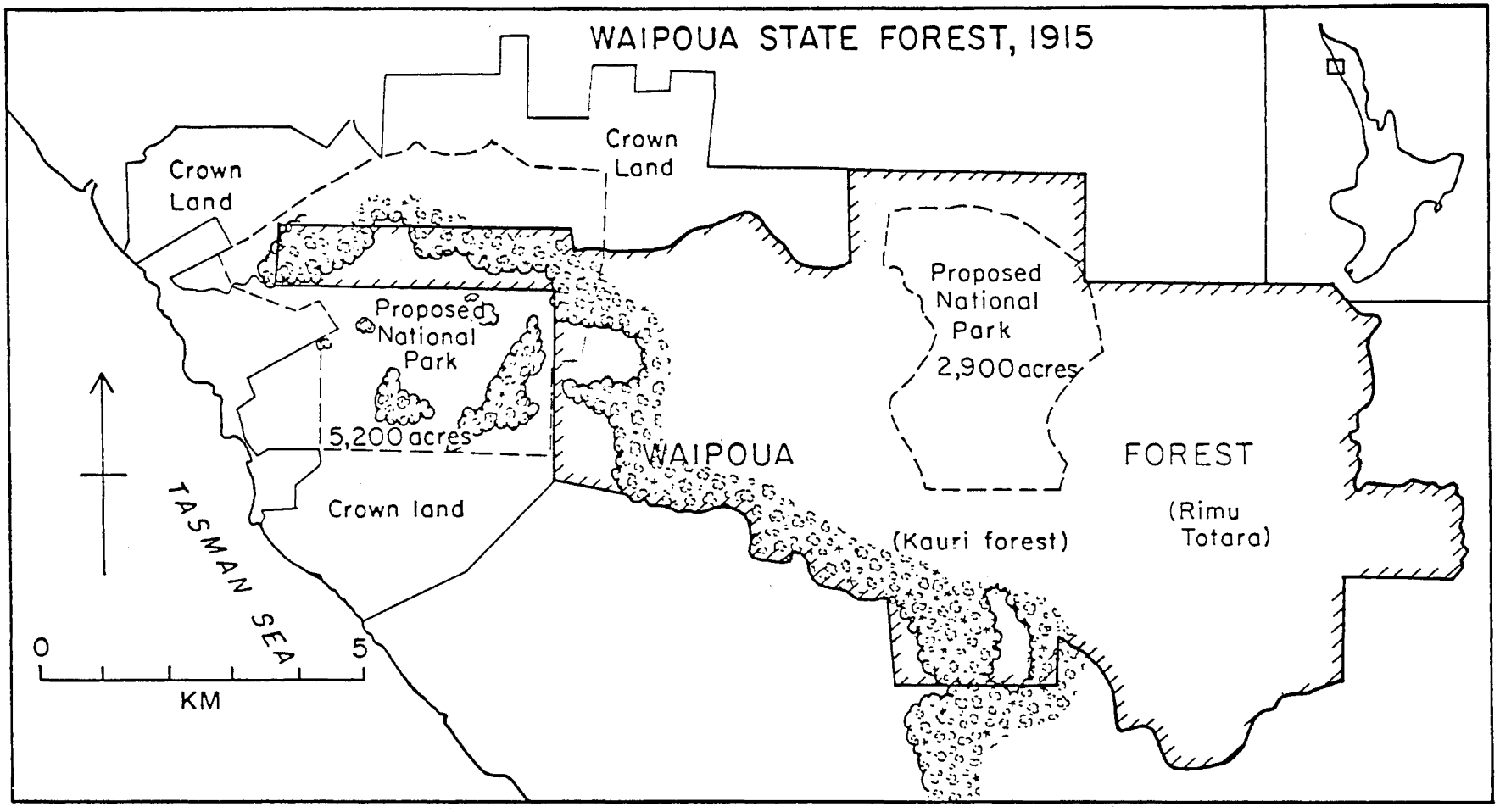
7. A forestry school was not re-established at Canterbury until 1970.

Figure 8.4



F 6/1/13

it has been regarded primarily as intended for settlement, for milling, for rotational management by the State Forest Service and as a national park (F6/1/13, Vol I-IX).

The conflicts between rotational forest management and preservation of Waipoua forest as a national park are perhaps the two themes of most far-reaching importance. In this respect it illustrates an unintended outcome of Ellis' directorship. Ellis endeavoured to secure all forest lands under State Forest Service jurisdiction. In this he was unsuccessful as Bell, his erstwhile ally, opposed him (see section 8.2). Ellis in encouraging recreational use of forests was in essence advocating a form of multiple use and saw no incompatibilities between forest utilization and preservation for aesthetic purposes.

In the decade before the formation of the State Forest Service there had been several calls for the establishment of a national park in the Waipoua forest. Cockayne, in his botanical survey of the area, emphasised the scientific and aesthetic values of the forest as,

> "a plant formation, one of the most rare, beautiful and at the same time scientifically interesting to be met with, not only in New Zealand, but in the world at large"
> (AJHR, 1908, C14, 2)

If milled, Cockayne believed it would only provide employment for a few years as the land was of minimal agricultural value. He urged that the forest be preserved as a national park.

The Royal Commission on Forestry also reported on the Waipoua forest. Its recommendations included the milling of the timber with the exception of "200 acres of the most characteristic and healthy parts of the forest" (AJHR, 1913, C12, XIX) which were to be established by Act of Parliament as a national park. In 1915 Prime Minister William Massey assured several parliamentarians, including Harry Ell, that a national park of 2000 to 2500 acres would be kept if the forest was disposed of. A report to the Minister of Lands by E. P. Turner in

1915 outlined two possible sites. One site of 2900 acres was comprised of fine specimens but more susceptible to fire damage than the alternative 5200 acres area (Figure 8.4).

Ellis was of the opinion that rotational sustained yield kauri forestry was a viable proposition and he was against passing control of the national forest estate from the State Forest Service to another government department. The agitation for a national park continued. A government proposal to put a road through the forest, a decision approved by the State Forest Service, served as a catalyst for public concern. Even the New Zealand Forestry League informed the Commissioner of State Forests of a resolution calling on the preservation of the entire forest as a 'national monument' (8.8.27, F6/1/13).

Eventually, a public pressure group, the Waipoua Forest Preservation Committee, was established in 1932 to press for preservation of the entire forest. William McGregor, who had undertaken research on the kauri forests in 1921-1925 and petitioned parliament over financial disputes with the State Forest Service, played an important part in this campaign, producing many expositions of the preservationists' viewpoint (McGregor, 1930, 1930a, 1948). Finally, in 1952, the forest was preserved as a forest sanctuary. This move effectively ended hopes of sustained yield kauri management, as the remaining areas were of insufficient size to provide a significant output.

The split between forest conservation and forest preservation became marked only in the last years of Ellis' Directorship. Earlier, around the turn of the century, when preservationist and scientific considerations for forest protection had joined the older utilitarian conservation arguments, both groups were united against an external pressure: settlement. Once settlement had effectively run its course and the State Forest Service interests had won control over forested

lands, the pragmatic approach of Ell and others who used the best argument for the circumstances, be it utilitarian, aesthetic or ecological, was no longer appropriate. At this point the incompatibilities between scenery preservation and production forestry, clearly appreciated by Bell, became too great and the two groups were thrown into conflict. This dichotomy was more recently accentuated by 1960s and 1970s environmentalism when foresters who considered themselves conservationists came under attack from other "conservationists" (eg. Brown, 1978).

8.5 SUMMARY

The successful establishment and first decade of State forestry in New Zealand poses several questions viz; Why was State forestry successfully put into operation, when early attempts had failed? How successful was Ellis in putting his policies into operation?

In his first annual report Ellis displayed a keen awareness of forest history in the Dominion";

> "New Zealand is now in the third "forestry boom", the first one dating back to the year 1874 when the self-same symptoms and fears of timber famine were expressed as are being voiced at the present time"
>
> (AJHR, 1921, C3, 1)

In this interpretation he was perhaps not entirely accurate. The "timber famine" arguments were present from the 1870s, but rather more attention then and until the 1890s was paid to the protection values of forestry than Ellis appeared to appreciate. The important point is that Campbell Walker, Kirk and Ellis produced reports on forest conditions in New Zealand that in many respects reached similar conclusions about the need for demarcation of the indigenous forests and management, on a rotational basis. Ellis was able to oversee the implementation of many of the recommendations in his 1920 report during

his period as Director of Forests. Residual political antagonisms, a misunderstanding of what State forestry was to achieve, and financial retrenchment curtailed Campbell Walker's activity. Kirk was similarly the victim of a change of government and financial retrenchment after only three years operations. Ellis was spared this fate for circumstantial and personal factors. He was a forceful and dynamic personality who had a powerful ally in Bell, Commissioner of State Forests from 1920-1922. Throughout the rest of his political career Bell retained his interest in forestry. Although Ellis caused the Massey administration discomfort through his reluctance to bend to saw milling interests over timber sales, the autonomy or existence of the State Forest Service was not threatened by exogenous political jealousies or economic considerations that had ended the earlier forestry eras in New Zealand.

Ellis did not however operate in a vacuum; rather he responded to the prevailing economic conditions and the potentialities and attributes of the physical environment. In the post-war years an international timber famine was generally expected. Ever rising timber prices and difficulties in securing imported supplies were the anticipated results. The timber shortages encountered during World War One seemed to offer a foretaste of what was to come. The wider economic environment was thus particularly receptive to organising State forest management in New Zealand and coupled with this, the spread of settlement, which had dominated land use activities in New Zealand, had slowed. The margins had been reached and, in not a few instances, exceeded. Settlement demands, the major barrier to forest management, were diluted and ceased to be a real obstacle at the point when the apparent "timber famine" provided the greatest incentives to establish a State Forest Service.

In this first quinquennial review of forestry operations Ellis expressed disappointment that only part of the forests policy outlined in 1920 had been accomplished. Contemporary accounts suggested that his greatest achievement was in improving the system of timber sales (Anon, 1942, 8). The crux of the 1920 report, rotational sustained yield indigenous forest management, remained unrealised. The reason for this may be explained with reference to the underlying assumptions of sustained yield forestry (Gould, 1962, Raup, 1964). The concept of sustained yield forestry was derived from the Western European experience. This system rested upon four basic assumptions, summarized by Gould, as scarcity, stability, certainty and a closed economy. In more detail they stated that,

1. timber products were so scarce that forest land was most profitably used in intensive wood production
2. a stable and regular flow of wood was required by the economy
3. production techniques and consumption patterns are known, allowing planned forest production decades in advance
4. forestry production units should equate production to consumption disregarding outside supplies or alternative landuses.

In North America all four of these assumptions had been violated (Raup, 1964). This was also the case, although not always in identical fashion, in New Zealand. In 1840, New Zealand was over fifty percent forested. For many decades timber products were not regarded as scarce and the forest was an obstacle more valued for the soils beneath it that could be converted to pasture. Similarly, per capita wood consumption varied throughout the later nineteenth and early twentieth centuries (AJHR, 1920, C3A) and Ellis predicted that it would continue to rise for another generation. During the years in which Ellis hoped to institute sustained yield forestry, sawn timber output increased

from 290 213 000 board feet in 1921 to 353 224 000 board feet in 1926. Meeting these levels of demand for another generation would so diminish the forest resources as to preclude demarcation and rotation of blocks of any size. At the same time little of the information about the biological characteristics of the New Zealand forests or consumption patterns for timber products was known. Ellis himself was responsible for initiating these basic programmes. Finally forestry production in New Zealand was not part of a closed economy; the country remained open to timber imports at all times. On occasions these reached significant levels, for example nearly 100 000 000 feet board measure in the mid 1920s (AJHR, 1930, C3, 20). Similarly, many sawmillers, with a saturation of the New Zealand market in the early twentieth century, relied on the Australian and other export markets. Timber imports and exports fluctuated in response to market conditions. The long term planning required for sustained yield management would not have been sensible, although Bell's restrictions on timber exports, even though only intended to have New Zealand resources utilized in the colony, in effect attempted to produce a closed economy.

The exotic forests, regarded today as Ellis' major achievement (Cumberland, 1981, 193) were in one sense an admission of failure to establish indigenous forest management. This was not Ellis' personal failure but the result of earlier resource depletion and expected future levels of timber consumption which exceeded the sustained yield capabilities of the remaining forest. To his credit however, once the results of the National Forestry Inventory were known, Ellis rapidly revised his thinking. While afforestation was the only viable solution it was untried on the scale required. Again, wider physical conditions such as the speed of growth of exotics and the availability of suitable lands, coupled with lowering of the costs of establishment, made

afforestation attractive. Ellis' personal contribution was to undertake exotic afforestation with great speed on an unprecedented scale. It was observed shortly after his death that his earlier work experience with Canadian Pacific Railways "imbued him with the idea of carrying out forestry projects on an ambitious scale" (Anon, 1942, 7). Thus a new resource was created, and with it distinctive new landscapes in the central North Island (Figure 8.5, 8.6). By 1959-1960 half of New Zealand's annual timber production was from exotic forests. Eight years later exotic production was double that of indigenous timbers (Simpson, 1973, Preface).

Figure 8.6

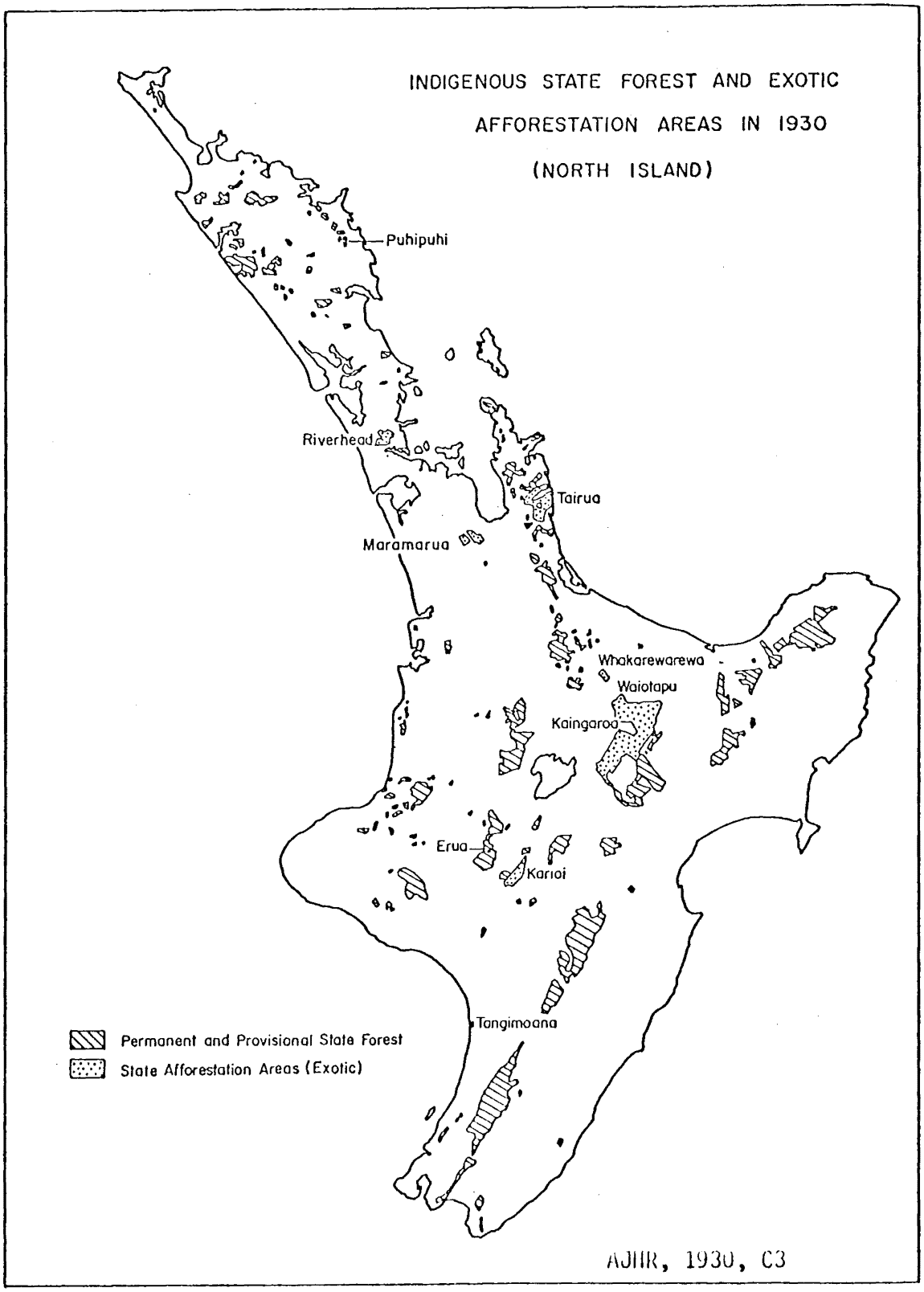
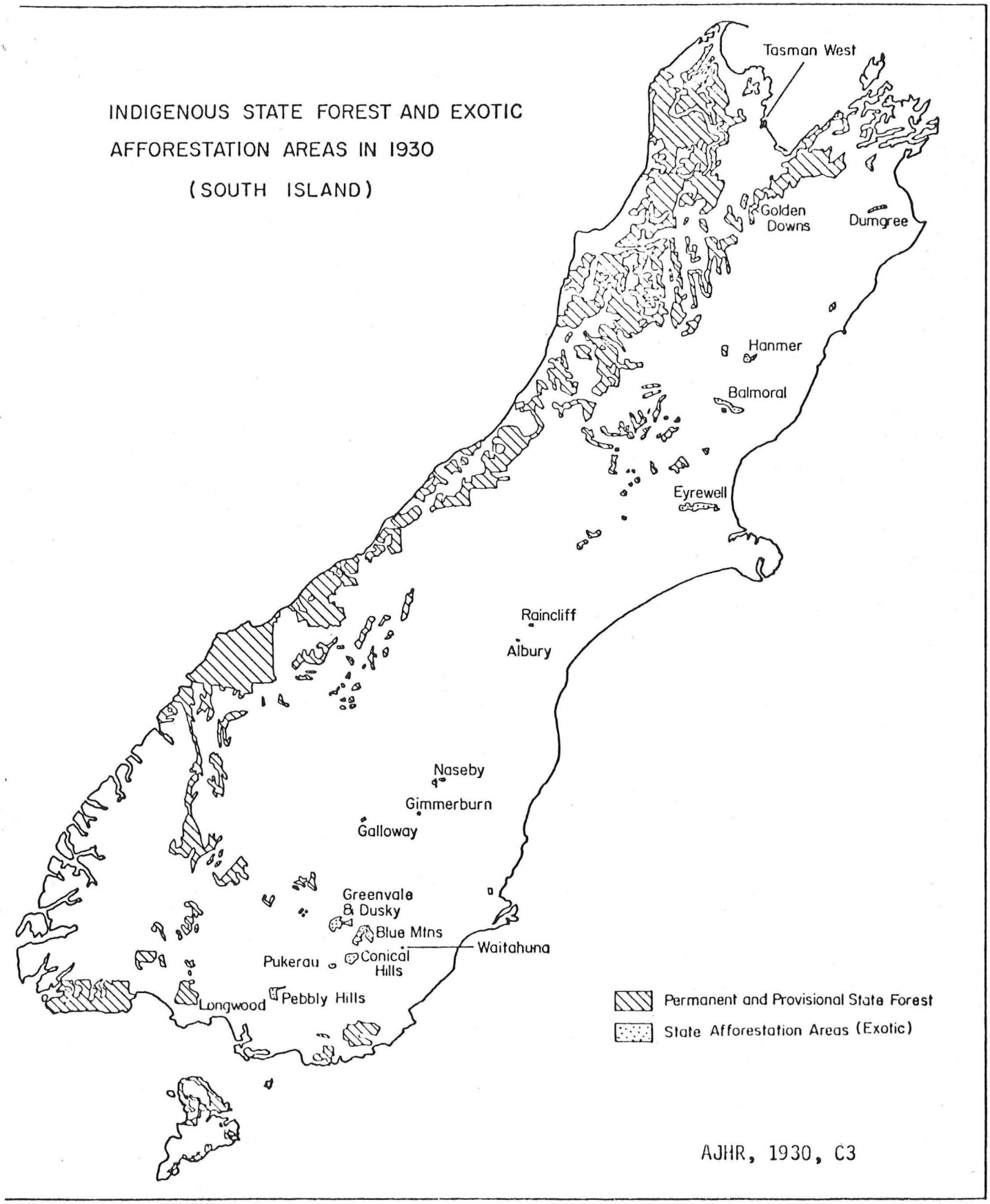

INDIGENOUS STATE FOREST AND EXOTIC
AFFORESTATION AREAS IN 1930
(NORTH ISLAND)
Puhipuhi
Riverhead
Tairua
Maramarua
Whakarewarewa
Waiotapu
Kaingaroa
Erua
Karioi
Tangimoana
Permanent and Provisional State Forest
State Afforestation Areas (Exotic)
AJHR, 1930, C3

Figure 8.5


INDIGENOUS STATE FOREST AND EXOTIC
AFFORESTATION AREAS IN 1930
(SOUTH ISLAND)
Tasman West
Golden Downs
Dumgree
Hanmer
Balmoral
Eyrewell
Raincliff
Albury
Naseby
Gimmerburn
Galloway
Greenvale & Dusky
Blue Mtns
Waitahuna
Pukerau
Conical Hills
Longwood
Pebbly Hills
Permanent and Provisional State Forest
State Afforestation Areas (Exotic)
AJHR, 1930, C3

CHAPTER IX

CONCLUSION

9.1 INTRODUCTION

Widespread deforestation in New Zealand during the nineteenth century has usually been interpreted from the viewpoint of the progress of settlement. Consequently other less prominent, but still important, questions about forest resources have been overshadowed. One particular facet of forest history in New Zealand, relating to the development of forest policy and management strategies from the 1840s to the 1930s, has been examined in detail. Hesitant steps towards more sophisticated forest policies and management procedures were taken throughout the nineteenth century, but progress was regularly checked by both endogenous and exogenous factors. The successful establishment of a completely independent State Forest Service in 1921 emerges as a culmination point of this sequence of development from minimal regulation on use to scientific State forestry.

The purpose of this concluding chapter is to draw together the major themes of man and nature and empathy with the past through an integrated discussion of the substantive and conceptual issues examined in the thesis. This takes the form of a discussion of the importance of perceptions and attitudes to geographical change drawing upon examples from the thesis. A subsequent section examines perceptions and appraisals of the New Zealand forest in greater detail and contrasts specific and endogenous elements with the role general and exogenous factors. In a final section the study period and some areas for further research are discussed.

9.2 PERCEPTIONS AND ATTITUDES

This survey of forest history in New Zealand from the 1840s to the 1930s has been undertaken from the perspective of seeing the land "with the eyes of its former occupants" (Sauer, 1941, 10). The relationships between man and nature that this perspective implies have been kept in focus throughout the thesis. These ideas have gained dual expression in the form of ideas about the nature of the biophysical environment and actions whereby natural resources were utilized by man. Within the first category, that of ideas, Tuan (1974) distinguishes fleeting perceptions of the environment from more stable culturally imbued attitudes towards the surrounding milieu.

One approach to understanding the relationship of perceptions and attitudes to the real environment is through drawing a distinction between the observer and the observed. Each observer is a unique combination of cognitive attributes and personality factors as well as more generally held cultural values. He or she, with varying degrees of acuteness, assesses the surrounding environment. But all such assessments are coloured by cultural values which give rise to what Tuan refers to as an attitude. The important point is that perceptions and attitudes are not independent creations of the human mind.

The observed, the real environment, also exerts an influence on the observer. This is the case in at least two senses, through direct impact on the mode of human occupation of a region and indirectly, but nonetheless pervasively through the appraisal of perceived environments. The latter relationship has received considerable attention throughout the thesis.

Perceptions and attitudes have been discussed together under the term environmental appraisal. These appraisals frequently gained expression and were exchanged between observers as ideas which were often

modified in the process. Popular, official and scientific sectors of the community presented distinctive appraisals of forest resources and environment in general. Although many basic ideas were commonly held emphasis varied considerably. The diffusion of ideas through these sectors is also a recognizable occurrence. For example scientific ideas about the influence of forest on flooding eventually became part of the popular appraisal replacing earlier beliefs that deforestation and afforestation were responsible for marked climatic deterioration and amelioration respectively. On other occasions similar ideas were independently evolved. For instance, displacement ideas, a belief that the indigenous flora was giving way to strong invading species, had popular and scientific support late into the nineteenth century.

Many ideas about the environment follow a common series of pathways after their genesis in an observer-observed matrix. Once developed an idea may win rapid and widespread acceptance, for example displacement ideas. Limited acceptance, such as was enjoyed by timber famine ideas in the 1870s, or rejection in favour of existing or alternative explanations was a more typical outcome. Discarded ideas may later be rejuvenated or in some modified form gain acceptance. The precocious interest shown by Harry Ell in representative areas in the early 1900s is such an instance. Interest waned, not to be revived until the 1960s, when similar ideas were couched in scientific terms were put forward (Atkinson, 1961).

One idea may eventually replace another, until on occasions widely accepted appraisals eventually acquire an axiomatic standing. This occurrence produces some special difficulties. Environmental apprais-als are selective or subjective and although they are not rational and object they are reasoned. The danger with axiomatic appraisals is that when challenged they tend to be defended in an unreasoned fashion.

In nineteenth century New Zealand all unoccupied land was assessed for its settlement potential. Forest lands, because they were thought to contain fertile soils, were especially favoured. Proposals for scientific State forestry challenged to some extent this appraisal of forest lands. The response however, was often excessive, negatively stated and unreasonably argued. Explanations of environmental phenomena that gain acceptance may in turn have direct impact or in more subtle ways influence decision making in areas only tangentially related.

An important question that requires careful consideration is the contribution that a study of ideas or perceptions and attitudes makes toward a geographical explanation. Guelke (1975) made a strong plea for historical geographers to seek explanations, based on internal factors: to "understand the thought behind the landscape" (Guelke, 1975, 137). Some humanistic geography, frequently it seems in reaction to a positivist approach, has emphasised this approach. This is a narrower and more limiting viewpoint than that adopted by Sauer who accepted a balance between external and internal factors. Guelke does not reject the importance of external factors, but limits their role to being treated "in relation to the ideas of people affected by them" (Guelke, 1975, 137). To endeavour to explain past events in terms of period understanding is a fruitful avenue, but to limit the explanation offered at the time is to offer a narrow and perhaps limited viewpoint.

Problems are evident in geographical explanations based entirely upon the use of expressed ideas[1] even with the slight concession Guelke makes to external factors. This is not to deny the contribution of

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1. I wish to thank Dr Chris Connolly for drawing some of these difficulties to my attention.

ideas to explanation, but to emphasise that there is a need for caution. A focus on expressed ideas ignores non-reasoned instinctive human actions. It also fails to fully consider the role of the natural environment. Moreover the value of retrospective insights seem to be denied by Guelke. This point is well illustrated with reference to the timber licensing system that operated from the late 1840s to the 1870s discussed in Chapter II. An attempt to understand timber licensing solely in period terms, provides insights into the origins of that system of forest management and arguments for its revision. But contemporary understanding was incomplete, hence the insights of Desmetz (1967) based on property rights highlight some underlying facets of forest management that were present around the mid nineteenth century, but not clearly perceived at the time.

The most critical question associated with using stated ideas as a satisfactory explanation of behaviour may however, concern the acceptance of expressed reasons as the real intention behind actions. Instances exist where ideas were drawn from a common pool and used as acceptable justifications for a course of action. Protagonists of land settlement and State forestry both used the ideas of progress and development to justify their stances while the variable arguments used by Harry Ell in support of forest conservation were often those calculated to best win approval. There is another problem in emphasising the role of ideas. They are not developed in a vacuum and some at least may strongly reflect wide social goals. That is, not only may ideas shape the wider context, but they may also be a product of societal goals.

These reservations about basing an interpretation of events solely upon expressed ideas with no reference to external factors or retrospective insights are significant. The insights obtained reconstructing

and "experiencing" the past are of central importance, but on their own they may provide an incomplete picture. A balanced approach concerned with internal and external factors provides a sounder base from which it is possible to hold specific details in juxtaposition with the wider context. In this fashion it is possible to isolate instances where one or other is more prominent in shaping geographies of the past.

9.3 NEW ZEALAND'S FORESTS: PERCEPTIONS, APPRAISALS AND A WIDER CONTEXT

Official, popular and scientific appraisals of the environment have been identified, within the context of forest resources in New Zealand, as providing three distinctive viewpoints. The composition of each appraisal of the forest resources of New Zealand and their inter and intra relationships has varied over time. The task of this section is an examination of the substance of various environmental appraisals in view of some of the questions raised in the previous section (9.2).

The official appraisal of forest resources has permeated a wide range of government files and published documents. On some occasions attitudes held were not expressed in writing, but in these instances actions provide some indication of the nature of the official appraisal. Glacken (1978) succinctly touches upon the difficulties of interpreting official sources such as those heavily depended on in this thesis:

> "One of the merits of studying the history of legislation is that laws are excellent indication of the abuses which provided their enactment; they are less trustworthy guides regarding accomplishments because of the gap between intent and enforcement"
>
> (Glacken, 1978)

The shortcomings in the administration of timber licensing from the late 1840s to the 1870s and beyond, where the enforcement of regulations proved exceedingly difficult illustrates this problem. Similarly, the gazetting of areas as State forests in the late nineteenth century had little practical impact in terms of protecting these lands from

fire, grazing and illegal use.

Popular appraisals, while numerically the largest group, are also the most difficult to recreate and assess. Popularly held views by their very nature are understood and tend to be expressed orally or retained in people's minds rather than recorded on paper. However, there exists a near verbatim source of nineteenth and early twentieth century ideas about forest resources that is both comprehensive and accessible. This takes the form of the New Zealand Parliamentary Debates. The opinions expressed in Parliament may not have been typical, for political divisions colour the discussions, but they do reflect the perceptions and attitudes of those in a position of authority. The debates contain, perhaps surprisingly, substantial quantities of material connected with forests from which a fairly detailed picture of attitudes and perceptions may be obtained. Thus it is possible to unlock some of the motivations behind forest advocates such as Potts in the 1860s and 1870s and Ell and Bell in the 1900s and 1910s and gauge the general responses of their colleagues.

The scientific appraisal has been identified as a distinctive and significant viewpoint. Before considering it further a pause is required to assess its composition. During the nineteenth century a scientific appraisal was not the exclusive preserve of a cadre of full time scientists. It also embraced the gentleman-naturalist, such as Potts and Travers as well as professionally qualified individuals such as Dobson and Peppercorne, both engineers. Many in turn had political connections, for example, Potts and Travers. Because of the nature of science this environmental appraisal produced quantities of published source material out of proportion to its size. This allows scientific appraisals to be examined in some detail, but also requires that their impact is not over stated.

Official, popular and scientific appraisals have been identified as three distinctive viewpoints. Official appraisals were made by Government administrators; particularly important were those in the Lands Department. The popular appraisal was that made by the ordinary settler and inherently difficult to define. To an extent they are reflected in Parliamentary opinions, which represent a special subset of popular appraisals, that are not necessarily typical, but do indicate the viewpoints of the elected decision makers. Scientific appraisals contained both professional and amateur elements. All appraisals had a shared membership, the function of a small population, and ideas flowed amongst the three. On occasions ideas appear to have been independently generated in different appraisals.

The relative weighting of official, popular and scientific appraisals of forest resources is also of central importance. Official appraisals have been present since a system of Crown Colony government accompanied organized European settlement. These appraisals were assessed from the viewpoint of the administration and "improvement" of the colony. Most often this meant encouraging settlement of forest lands. Popular appraisals have also been of considerable importance as is reflected in the enthusiasm of political representatives for achieving wider social aspirations. Particularly critical were the occasions where the popular appraisal caused changes in official policy. Scientific appraisals have typically had more limited impact upon the official sector. Their major contribution was in the field of botanical discovery and classification. However, later in the nineteenth century, as scientists accumulated more detailed knowledge of the natural environment, they were able to direct this information into forest management decision making. Paradoxically, this increased knowledge of forest resources was gained at the expense of its communication to official and

popular sectors. Officials, particularly from the late nineteenth century, were faced with recommendations based on scientific investigations without being able to evaluate the research.

A fairly small number of issues gained recurrent attention in the official, popular and scientific appraisals of forest resources. These included:

1. the displacement concept - a belief that the indigenous flora and fauna were giving way to stronger invading species
2. the forest influences concept - this attributed climatic modification to deforestation and afforestation;it was subsequently modified to emphasise flood protection
3. a forest growth rates debate - indigenous forest species were generally regarded as slow growing, although visiting foresters disagreed with this assessment
4. a timber famine - this was a persistent concern from the 1870s in New Zealand.

Each of these four appraisals provided a rationale for forest management, but won only slow acceptance because they appeared to conflict with the land settlement ethos.

The Displacement Concept

A number of forest management systems directed towards timber extraction were adopted in New Zealand. These ranged from regulated use through timber licensing and reserves to afforestation activity and plans for rotational indigenous forestry. The displacement idea and subsequently timber famine concerns had the greatest impact. The notion of displacement of the indigenous flora by superior invading species suggested that the indigenous forests were doomed. In consequence forest stock grazing, wind and fire damage were not regarded as significant causes of forest retreat. Displacement ideas inhibited exploration of the full potential of indigenous forest species. Management strategies at the time consisted of regulating the exploitation of

the forest. Any concern for timber supplies in the future tended to be expressed in terms of afforestation proposals. This was to be undertaken with exotic species which performed well when introduced into the New Zealand environment. Only a few independent observers continued to champion the indigenous forest species with regard to replenishing timber supplies.

The Forest Influence Concept

The forest influence concept provided a rationale for another type of forest reserve. A belief that forests had a marked impact on the climate caused them to be regarded as more than a source of timber. The expansion of this concept suggested that afforestation could restore the climate of a district and contributed to one type of forestal activity. Empirical investigation by the overseas scientific community of the forest influence question caused a revision of ideas. Flood protection and water conservation received emphasis over climatic modification. But although the reasoning had altered, a stronger case for protection forests now existed.

A Forest Growth Rates Debate

The widespread official, popular and scientific view that the indigenous forests were slow growing was held in spite of an absence of comprehensive data. The implications were significant for the future direction of forest policy and management. Concurrently, exotic forest trees, notably pines and eucalypts, were found to grow rapidly in their new environment. In conjunction the difficulties of propogating and regenerating indigenous species and the apparent advantages of exotics led to early official efforts being directed towards afforestation incentive schemes. The advocacy of the Britisn forester David Hutchins

from 1915 to 1920 reversed official thinking. But in the 1920s McIntosh Ellis calculated that demand would exceed the supply of available indigenous forest stocks and took the bold step of embarking on large scale afforestation.

A Timber Famine

Fears of a timber famine were voiced soon after the beginnings of organized settlement in New Zealand and gradually gained momentum in scientific and official circles as the land was progressively deforested. The popular response was afforestation, which was received official support in the 1870s. Late in the nineteenth century direct State involvement in afforestation activity began. Scientific State forestry as undertaken in Europe and India, emphasised the natural regeneration and harvesting of indigenous forests, and was virtually unknown in New Zealand. Efforts at its introduction had been severely hampered by a clash of interests with land settlement goals. Scientific State forestry was not successfully introduced until the first decade of the twentieth century, when concern about a timber famine peaked and land settlement demands were largely satisfied. However, the extent of forest resources and projected levels of demand necessitated a shift from orthodox indigenous forestry to an extensive programme of exotic afforestation.

Various official, popular and scientific appraisals of forests, particularly those centring upon displacement ideas, forest influences, growth rates and a timber famine, provide significant insights into the forest history of New Zealand. However, some aspects of the initiation and demise of State forestry in the nineteenth century were the product of exogenous concerns. The substance of Vogel's Forests Act of 1874 was drawn from his personal observations, the advocacy of others, and

a perusal of forestry literature. But in the wider context it may be viewed as part of Vogel's large scale public works and development strategies. The Act was the product of his expansive financial designs. The emasculation of the Forests Act was a result of the rejection of Vogel's bold borrowing and development policies and their replacement by financial restraint under Premier Atkinson. This sequence of events was replayed by Vogel and Atkinson with the State Forests Act, 1885. The rise and fall, although not the fine detail of forestry, is part of a wider economic and social context.

The focus throughout has been upon the roles played by various individuals in shaping forest policy and management in New Zealand. The intention has not been to deny the importance of the wider context, but rather to highlight the special and particular contributions of many individuals in their wider setting.

9.4 THE FOREST HISTORY OF NEW ZEALAND AND SUGGESTIONS FOR FURTHER RESEARCH

This venture into the forest history of New Zealand focussed on the development of policy and management practises from the 1840s to the 1930s. In sequence this touches upon the Royal Navy's interest in the 1840s, timber licensing and reserves in the 1850s, 1860s and 1870s, efforts to initiate scientific State forestry in the 1870s and 1880s, aesthetic and scientific rationales for forest preservation in the 1890s, and the establishment of State forestry in the twentieth century. This latter phase is dominated by the reorientation toward extensive State afforestation.

This study draws to a close around 1930 when a natural pause occurs. Ellis, the first Director of Forests, had departed in 1928 and large scale afforestation efforts had peaked in the early 1930s. A transition from deforestation to afforestation, from indigenous to

exotic species, from minimal concern to a comprehensive policy and management strategy had been completed.

An examination of forest policy and management from 1840 to 1930 by no means exhausts the potential for research into the forest history of New Zealand. There is scope for fruitful investigations into forest policy and management since the 1930s. This could focus either on the exotic forests or the remaining indigenous forests. Since the 1970s public interest groups such as the Native Forests Action Council (NFAC) and the New Zealand Forest Service have come into repeated conflict over the future of remnant areas of indigenous forest. The conservationist versus preservationist clash that occurred over Waipoua Kauri forest in the 1930s and 1940s has been re-enacted on a larger scale in the Paparoa Ranges and Whirinaki in the 1970s.

Alternatively the timber industry in the nineteenth century appears to have been overlooked with most attention being given to land settlement. Yet the timber industry was a significant employer and export sector during the nineteenth century. Another possibility is searching for the existence of an intermediate timber cutting phase in some areas between taking up land and achieving self sufficiency from agricultural use of the land.

These four suggestions are not exhaustive, but may go some way to achieving a fuller understanding of forest history and New Zealand's past as a whole. In 1874 Premier Julius Vogel asserted that, "there is no subject more important for New Zealand" (NZPD, 1874, 16, 79) than the forests question. But concentration on a land settlement perspective has overshadowed the importance of forests in nineteenth century New Zealand. A man and nature perspective coupled with careful attention to the perceptions and attitudes of former occupants provides an understanding and elucidation of the important position occupied by

forest resources in New Zealand throughout the nineteenth and early twentieth centuries.

ACKNOWLEDGEMENTS

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The staff of National Archives, Alexander Turnbull Library, Canterbury Museum, Christchurch Public Library, General Assembly Library, Hocken Library and the University of Canterbury Library all responded to the sometimes trying requests that were made during the research period. I also wish to thank the staff of the Department of Lands and Survey and the New Zealand Forest Service for making file material and working space available. Their interest in the early history of their respective departments is reassuring.

I thank my fellow post-graduates who, by following a diversity of research interests, have sharpened my personal outlook on geography. Finally, but not least, special acknowledgement is due to the efforts of Sandy Anderson who remained enthusiastic and efficient when typing even the most daunting of cut and paste chapters.

APPENDIX 1

MAORI, EUROPEAN AND BOTANICAL NAMES FOR INDIGENOUS TREES

Maori	European (nineteenth century)	Botanical 1 (Hooker, 1864)	Botanical 2 (contemporary)
Softwoods			
Kahikatea	White Pine	Podocarpus dacrydioides	→
Kauri	Kauri[1]	Damma australis	Agathis australis
Matai	Black Pine[2]	Podocarpus spicatus	→
Miro	Miro[3]	Podocarpus ferrugineus	→
Rimu	Red Pine	Dacrydium cupressinum	→
Totara	Totara	Podocarpus totara	→
Tanekaha	Celery Pine	Phyllocladus trichomanoides	→
Hardwoods			
Hinau		Elaeocarpus dentatus	→
Mangeao		Tetranthera calicaris	Litsea calicaris
Manuka	Tree Tree	Leptospermum spp	→
Pukatea		Atherosperma nova zelandiae	Laurelia Novae Zelandiae
Puriri		Vitex littoralis	→
Rata	Ironwood	Metrosideros spp	→
Rewarewa		Knightia excelsa	→
Taraire	Mountain Beech[4]	Nesodaphne taraire	Beilschmiedia taraire
Tawa[5]		Nesodaphne tawa	Beilschmiedia tawa
Tawaii	Silver Beech	Fagus menzeii	Nothofagus menzeii
Tawhai		Fagus cliffortioides	Nothofagus cliffortioides
Tawhai	Black Beech	Fagus solanderi	Nothofagus solanderi

Notes:

1. Also known as Koudi, Cowrie or New Zealand Pine up to the 1840s
2. Known as Red Pine in Nelson
3. Miro replaced the European Black Pine by the 1870s
4. Many Beeches were also referred to as Birches
5. In many instances Maori names are in general usage.

This listing is drawn from Hooker (1864), Blair (1876), Kirk (1889), Allan (1961) and Moore and Edger (1970). It is selective rather than exhaustive in nature.

BIBLIOGRAPHY

1. OFFICIAL PUBLISHED

Appendices to the Journals of the House of Representatives
Appendices to the Journals of the Legislative Council
New Zealand Bills
New Zealand Gazette
New Zealand Parliamentary Debates
New Zealand Statistics
New Zealand Statutes
New Zealand Year Book
Votes and Proceedings of the Provincial Councils

2. UNPUBLISHED OFFICIAL PAPERS

a Provincial Papers

Auckland Province

Superintendents Inwards Correspondence (National Archives)	AP/2	1866-1872	
	AP/3	1873-1875	

Canterbury Province (Canterbury Museum)

Chief-Surveyors Letter Book (Outwards)	No 1	1851-1862	47/1
" " "	No 2	1862-1864	47/2
" " "	No 3	1865-1867	47/3
" " "	No 4	1867-1869	47/4
Executive Council Minutes	No 3	1860-1862	
Lands Office Nominal Register (Inward Letters)		1853-1875	8/1C
Lands Office Letter Book (Outwards)		1850-1853	5/1
" " "		1853-1856	8/1
" " "		1856-1857	8/2
" " "		1867-1872	8/3
" " "		1872-1875	8/4
Provincial Secretary's Letter Book (Outwards)		1857-1859	
Provincial Superintendent and Secretary (Inward Letters)		1853-1875	
Superintendents Letter Book (Outward)		1853-1854	
		1857-1861	
Timber Cutting Licences Register		1851-1852	16/1A
Waste Lands Commissioners Nominal Register (Outward Letters)		1853-1875	8/1B

Hawkes Bay

Report of the State of the Province as regards timber (National Archives)		HB 1/9
Report on Bush Contained in Crown Lands (National Archives)		HB 1/9

Nelson

Timber Licences (National Archives)	1852-1864, 1872	LS-N	5/11

Otago (Hocken Library unless otherwise indicated)

Commissioner of Crown Lands Correspondence (Outward)	Vol 1 1851-1855		309
Miscellaneous Fees Cash Book	1865-1875		60
Otago Waste Lands Board Minute Books	No 1&2 1859-1870		83
" " " "	No 3 1870-1874		120
" " " "	No 4 1874-1876		121
Otago Provincial Council, Return Area and Position of Bushlands (National Archives)		OP	1/22

Southland

Commissioner of Crown Lands Letters (Outwards)	1859-1863	LS-I	5/1
" " "	1863-1869		5/2
" " "	1867-1871		5/3
" " "	1871-1874		5/4
(National Archives)			
Lands and Survey Papers. Forests	1863-1869	SP	15/8

b Government Departments

Executive Council Files

EC 1/1	Executive Council Minutes	1841-1845

State Forest Service

F	Applications for the Appointment of Director of State Forests	
F 2	Monthly Reports of the Chief Forester	1899-1908
F 6/1/13	Waipoua State Forest (13 volumes)	
F 6/1/13/1	W R McGregor's Reports on Waipoua Forest	1920-1929
F 6/1/13/6	Waipoua State Forest Press Clippings	

F 9/1/4 Trounson Kauri Park

F 10/1 Conservator of Forests Appointment 1875

F 11/1 Royal Commission on Forestry Minutes
11/2 " " " Correspondence
11/3 " " " "

F 13/4 State Forest Service Newsletter 1921-1952

F 45/11 Circular Letters to Conservators of Forests

F 45/25 New Zealand Forestry League Cooperation with State Forest Service 1921-1929

Governor's Files

G 1/1 Governors Despatches No 8 1840
1/3 " " No 29 1841

G 13/4 Governors Miscellaneous Correspondence 1873-1877

Internal Affairs Files

IA 1/874/1356 Conservation of Forests

IA 3/1/10 Surveyor Generals Register 1850-1851

Lands Department Files

LS 1/48191 Preservation of Native Forests

LS 1/51887 Scenery Preservation Commission

LS 53/1-10 Forests and Agriculture Branch, Registered Files
53/14 Outward Memorandum Book 1885-1889
53/15 " " " 1885-1887
53/16 " " " 1886-1889
53/17 " " " 1887-1889

LS 56/1 State Forests Branch Memoranda 1899-1902

LS 70/1-2 Scenery Preservation Commission Minute Books 1904-1906

LS 73/1 Timber and Timber Building Industries Commission 1909 Report
73/2 Newspaper clippings

Crown Lands Circulars 1883-1891 (81/6 Canterbury Museum)

Surveyor Generals Correspondence 1876-1907 (81/1-81/4 Canterbury Museum)

Legislative Department

LE 1/1872/16 Tidal Creek Floatage of Timber Bill

LE 1/1874/133 Governor Fergusson's Correspondence with USA on Forests

LE 1/1922/5 Joint Commission on Forestry

LE 1/1928/223 Return of Exotic trees planted 1921-1926

3. MANUSCRIPTS AND PRIVATE PAPERS

Harry Ell, Letterbooks and Miscellaneous Correspondence, Canterbury Public Library, Alexander Entrican 1963 MS, Alexander Turnball Library

4. NEWSPAPERS

Christchurch Star
Dominion
Herald
Otago Daily Times
Press

5. BOOKS AND ARTICLES

ALBION, R. G. (1926) Forests and Sea Power, The Timber Problem of the Royal Navy 1652-1862. Harvard University Press, Cambridge Mass.

ALLAN, H. H. (1936) Indigene versus alien in the New Zealand Plant World. Ecology, 17 (2): 187-193.

ALLAN, H. H. (1961) Flora of New Zealand Volume I. Government Printer, Wellington.

ALLEN, R. B. (1978) Scenic Reserves of Otago Land District. Lands and Survey, Wellington.

ALLSOP, F. (1969) The First Fifty Years of New Zealand's Forest Service. Government Printer, Wellington. New Zealand Forest Service Information Series No 59.

ANON, (1872) Ornithology of New Zealand. Nature, 6: 218-219.

ANON, (1884) The Sale and Settlement of Forest Land. The Monthly Review, 5(8).

ANON, (1919) Forestry and Land Settlement - A New Zealand View. The Australian Forestry Journal, 2(9): 57-58.

ANON, (1926) Forest Fire Districts. Principles of Application and Use in the Control and Prevention of Forest Fires. New Zealand State Forest Service Circular No 8.

ANON, (1927) Canterbury College School of Forestry. Whitcombe & Tombs, Christchurch.

ANON, (1928) Notes. Te Kura Ngaheri, 2(3): 36.

ANON, (1942) Leon McIntosh Ellis, B.Sc.F. New Zealand Journal of Forestry, 5(1): 6-8.

ARMSTRONG, J. B. (1879) A Short Sketch of the Flora of the Province of Canterbury, with a Catalogue of Species. Transactions of the New Zealand Institute, 12: 325-353.

ARMSTRONG, J. F. (1871) On the Naturalized Plants of the Province of Canterbury. Transactions of the New Zealand Institute, 4: 284-291.

ARNOLD, R. (1976) The Virgin Forest Harvest and the Development of Colonial New Zealand. New Zealand Geographer, 32(2): 105-126.

ARTHUR, W. (1881) On the Taieri River Floods and their Prevention. Transactions of the New Zealand Institute, 14: 94-100.

ATKINSON, I. A. (1961) Conservation of New Zealand Soils and Vegetation for Scientific and Educational Purposes. New Zealand Science Review, 19(4): 65-73.

BABER, J. (1872) On the Rate of Growth of Native Trees Under Cultivation. Transactions of the New Zealand Institute, 5: 451-452.

BABER, J. (1885) On the Growth of Transplanted Trees. Transactions of the New Zealand Institute, 18,311-314.

BABER, J. (1887) Rate of Growth of Transplanted Trees. Transactions of the New Zealand Institute, 20: 186-187.

BAKER, A. R. (1978) Historical Geography: understanding and experiencing the past. Progress in Human Geography, 2(3): 495-504.

BAKER, A. R. (1979) Historical Geography: a new beginning. Progress in Human Geography, 3(4): 560-570.

BALFOUR, C. E. (1865) Results of a Series of Experiments on the strength of New Zealand Woods and of the Colonial Woods. Appendix C In Reports and Awards of the Jurers and Appendix. New Zealand Exhibition, Dunedin, 1865. Mills Dick and Company, Dunedin.

BANNISTER, M. H. (1973) The Origins of Radiata Pine in Cultivation. What's New in Forest Research, No 2 June.

BARKER, M. A. (1870) Station Life in New Zealand. MacMillan, London.

BARNETT, M. J. (1946) The History and Development of Tree Planting in Canterbury. Journal of the Royal New Zealand Institute of Horticulture, 16(1): 1-22.

BARR, G. M. (1872) On the Taieri Floods. Transactions of the New Zealand Institute, 4: 111-119.

BARTON, I. :. (1975) The Management of Kauri Forests: A Historical Review of Government Policy and a proposal for the future. New Zealand Journal of Forestry, 20(1): 89-106.

BASSETT, J. (1975) Sir Harry Atkinson 1831-1892. Auckland University Press, Oxford University Press, Auckland.

BEASLEY, A. (1930) Timber Industry in New Zealand. M.A. Thesis, Auckland University, Auckland.

BEEVER, J. (1981) A map of the Pre-European Vegetation Cover of Northland, New Zealand. New Zealand Journal of Botany, 19(1): 105-110.

BELL, F. (1919) A Forestry Policy For New Zealand. New Zealand Journal of Agriculture, 18(5): 313-318.

BLAIR, W. N. (1876) The Building Materials of Otago. Transactions of the New Zealand Institute, 9: 134-181.

BOARDMAN, W. (1938) A Hundred Years of Forest Legislation. New Zealand Journal of Forestry, 4(3): 180-186.

BOARDMAN, W. (1940-41) New Zealand Forest Legislation. New Zealand Journal of Forestry, 4(5): 328-330.

BOARDMAN, W. (1942-44) New Zealand Forest Legislation. New Zealand Journal of Forestry, 5(1): 50-53.

BOARDMAN, W. (1951) The Trend of Forest Law. New Zealand Journal of Forestry, 6(3): 199-218.

BOWEN, G. F. (1868) Inaugural Address to the New Zealand Institute. Transactions of the New Zealand Institute, 1: 9-15.

BROOKS, C.E. (1927) The Influence of Forests on Rainfall. Empire Forestry Journal, 6(2): 210-218.

BROOKS, C. E. (1928) The Influence of Forests on Rainfall and Run-off. Quarterly Journal of the Royal Meteorological Society, 54(225): 1-17.

BROWN, G. S. (1978) New Zealand Conservation by the Forest Service. The Commonwealth Forestry Review, 57(3) Vol 73: 164-165.

BROWN, J. C. (1877) Forests and Moisture. Oliver and Boyd, Edinburgh.

BROWN, J. C. (1877a) Reboisement in France. King and Co, London.

BROWN, J. C. (1877b) The School of Forestry in Europe. Oliver and Boyd, Edinburgh.

BROWN, L. (1968) The Forestry Era of Professor Thomas Kirk, F.L.S. New Zealand Forest Service, Information Series No 56.

BROWN, L. and McKINNON, A. D. (1966) Captain Inches Campbell Walker, New Zealand's First Conservator of Forests. New Zealand Forest Service, Information Series No 54.

BUCHANAN, J. (1869) Sketch of the Botany of Otago. Transactions of the New Zealand Institute, 1: 22-53.

BULLER, W. L. (1872) A History of the Birds of New Zealand. Voorst, London.

BURDON, R. M. (1948) The Life and Times of Sir Julius Vogel. Caxton, Christchurch.

CAMERON, R. J. (1961) Maori Impact upon the Forests of New Zealand. Historical Review, 9(3): 131-141.

CAMERON, R. J. (1964) Destruction of the Indigenous Forests for Maori Agriculture during the nineteenth century. New Zealand Journal of Forestry, 9(1): 98-109.

CAMPBELL WALKER, I. (1876) The Climatic and Financial Aspect of Forest Conservancy as applicable to New Zealand. Transactions of the New Zealand Institute, 9, xxvii-xiix.

CAMPBELL WALKER, I. (1876a) State Forestry: Its aim and Object. Transactions of the New Zealand Institute, 9: 187-203.

CANTERBURY ASSOCIATION, (1850) Canterbury Papers No 1 and 2.

CHEESEMAN, T. F. (1882) The naturalized plants of the Auckland Provincial District. Transactions of the New Zealand Institute, 15: 268-298.

CHEESEMAN, T. F. (1913) The Age and Growth of the Kauri (Agathis australis). Transactions of the New Zealand Institute, 46: 9-19.

CHEESEMAN, T. F. (1917) Forestry in New Zealand. The Journal of Agriculture, 15(6), 344.

CLARK, A. F. (1926) Canterbury's Native Bush. Te Kura Ngahere 2(1): 15-22.

CLARK, A. H. (1949) The Invasion of New Zealand by People, Plants and Animals. Rutgers University Press, New Brunswick.

CLARKE, W. B. (1876) Effects of Forest Vegetation on Climate. Proceedings of the Royal Society of New South Wales, 10: 179-235.

COCKAYNE, L. (1901) Discussion of Papers. Conference of the New Zealand Fruitgrowers and Horticulturalists, Dunedin, pp 112-115.

COCKAYNE, L. (1921) The Vegetation of New Zealand. Englemann, Leipzig.

COCKAYNE, L. (1923) Professor E. H. Wilson on New Zealand Forests and Forestry. New Zealand Journal of Science and Technology, 6(4): 218-222.

COCKAYNE, L. (1926) Monograph on the New Zealand Beech Forests. Government Printer, Wellington.

COCKAYNE, L. (1928) Forest Ecology, New Zealand. British Empire Forestry Conference, Government Printer, Canberra.

COCKAYNE, L., SIMPSON, G. AND THOMPSON, J. S. (1932) Some New Zealand indigenous-induced weeds and indigenous-induced modified and mixed plant communities. Journal of the Linnean Society of London Botany, 149(326): 13-44.

COONEY, E. A. (1949) History of the Selwyn Plantation Board. New Zealand Journal of Forestry, 5(1): 11-19.

COUGHLAN , L. (1964) The Growth of State Forestry in New Zealand. A Brief Review. New Zealand Journal of Public Administration, 26(2): 66-79.

CUMBERLAND, K. B. (1941) A Centuries Change: Natural to cultural vegetation in New Zealand. Geographical Review, 31(4): 529-554.

CUMBERLAND, K. B. (1961) Man in Nature in New Zealand. New Zealand Geographer, 17(1): 137-154.

CUMBERLAND, K. B. (1981) Landmarks. Readers Digest, Surrey Hills, N.S.W.

DALZIEL, R. (1981) The Politics of Settlement. In Oliver, W. H. and Williams, B. R. eds. The Oxford History of New Zealand. Oxford University Press, Wellington pp 87-111.

DANA, S. T. (1956) Forest Influences. In Haden-Guest, S. Wright, J. K. and Telclaff, E.M. eds. A World Geography of Forest Resources. Ronald Press, New York, pp 49-63.

DARBY, H. C. (1951) The Changing English Landscape. Geographical Journal, 117(4): 377-398.

DARBY, H. C. (1956) The Clearing of the Woodland in Europe In Thomas, W. L. ed. Man's Role in Changing the Face of the Earth. University of Chicago Press, Chicago, pp 183-216.

D'ARCY, W. E. (1910) Preparation of Working Plans in India. Superintendent Government Printing, Calcutta. 4th Edition.

DARWIN, C. R. (1933) Charles Darwin's Diary of the Voyage of HMS "Beagle". ed. from the MS by N. Barlow. University Press, Cambridge.

DARWIN, R. C. (1951) The Origins of Species (6th edition 1st published 1872). Oxford University Press, London (1st edition 1859).

DEANS, J. (1964) Pioneers on the Port Couper Plains. Simpson and Williams, Christchurch.

DEMSETZ, H. (1967) Toward a theory of Property Rights. American Economic Review, 67(2): 347-359.

DIEFFENBACH, E. (1843) Travels in New Zealand. Murray, London.

DINGWALL, P. R. (1981) Harry Ell's vision in Nature Conservation. Landscape, 10: 23-27.

DINSDALE, E. M. (1965) Spatial patterns and technological change: the lumber industry of northern New York. Economic Geography, 41(3): 252-274.

DOBSON, A. D. (1871) On the destruction of land by shingle-bearing rivers, and suggestions for protection and prevention. Transactions of the New Zealand Institute, 4: 153-157.

DOBSON, A. D. (1881) On the Reclamation of Waste River Beds. Transactions of the New Zealand Institute, 14: 100-103.

DOYNE, T. (1864) Report upon the plains and rivers of Canterbury, New Zealand. "Press", Christchurch.

DUERR, W. A. and others (1979) Forest Resource Management: decision making principles and cases. Saunders, Philadelphia, 2 Volumes.

E. (1920) New Zealand Forestry Part 1, D E Hutchins. Journal of Forestry, 18(6): 634-635.

ELLIS, L. McI. (1920) Forestry. Report of the Proceedings of the Annual Meeting of the New Zealand Forestry League, Wellington, July 7th 1920. pp 15-19.

ELLIS, L. McI. (1922) The Progress of Forestry in New Zealand. Paper prepared for the 16th Australiasian Association for the Advancement of Science Congress. Government Printer, Wellington.

ELLIS, L. McI. (1923) Forests and Forestry in New Zealand. Prepared for the Imperial Forestry Conference, Ottawa. Government Printer, Wellington.

ELLIS, L. McI. (1935) Afforestation in the Antipodes. Journal of Forestry, 33(5): 523-526.

ENTRICAN, A. R. (1963) Influence of forestry on forest policy and forest products in Australia and New Zealand. University of British Columbia, Vancouver. H. R. MacMillan Lectureship Address.

ENTRICAN, A. R. and HOLLOWAY, J. T. (1956) New Zealand In Haden-Guest, S. Wright, J. T. and Telclaff, E. M. eds. A World Geography of Forest Resources. Ronald Press, New York, pp 591-609.

ENTRIKIN, N. J. (1976) Contemporary humanism in geography. Annals of Association of American Geographers, 66(4): 615-632.

ERIKSEN, N. J. (1971) Human Adjustments to Floods in New Zealand. New Zealand Geographer, 27(2): 105-129.

FERNOW, B. E. (1907) A Brief History of Forestry in Europe, the United States and other Countries. University Press, Toronto.

FIRTH, J. C. (1874) On Forest Culture. Transactions of the New Zealand Institute, 7: 181-195.

FLETCHER, I. R. (1982) Parties in the New Zealand House of Representatives, 1870-1890. M.A. Thesis University of Canterbury, Christchurch.

FORREST, J. (1963) Locating the Vegetation of Early Coastal Otago: A Map and its Sources. Transactions of the Royal Society of New Zealand. (Botany) 2(4): 49-58.

FOSTER, F. W. (1936) An historical account of timber rights under New Zealand mining laws. New Zealand Journal of Forestry, 4(1): 2-15.

FRANKLIN, S. H. (1960) The Village and the Bush. Pacific Viewpoint, 1(2): 143-182.

FRAWLEY, K. J. (1981) Rainforest Management in Queensland before 1900. Paper presented at the 51st ANZAAS Congress, Brisbane, Australia May 1981.

GARDNER, W. J. and others (1973) A History of the University of Canterbury. University of Canterbury, Christchurch.

GARFIELD, E. (1970) Citation Indexing for studying Science. Nature, 227: 669-71.

GILLIES, R. (1877) Notes on some changes in the Fauna of Otago. Transactions of the New Zealand Institute, 10: 306-324.

GLACKEN, C. J. (1978) The Origins of the Conservation Philosophy In Blunden, J. and others. Fundamentals of Human Geography: A Reader. Harper Row, London, pp 272-276.

GRAHAM, J. (1981) Settler Society. In Oliver, W. H. and Williams, B. R. eds. The Oxford History of New Zealand. Oxford University Press, Wellington, pp 112-139.

GROSSMAN, J. P. (1908) The Evils of Deforestation. Brett, Auckland.

GUELKE, L. (1974) An Idealist Alternative in Human Geography. Annals of the Association of American Geographers, 64(2): 193-202.

GUELKE, L. (1975) On Rethinking Historical Geography. Area, 7(2): 135-138.

HAMER, D. (1962) The Agricultural Land Company and New Zealand Politics 1877-86. Historical Studies, 10(38), 141-164.

HAMILTON, A. (1895) On the Forests of New Zealand. Transactions of the New Zealand Institute, 28: 147-163.

HARDIN, G. (1968) The Tragedy of the Commons. Science, 162(3859): 1243-1248.

HARRIS, W. W. (1974) Three Parks; an analysis of the Origins and Evolution of the New Zealand National Park Movement. M.A. Thesis, University of Canterbury, Christchurch.

HART, S. G. (1966) Private Forestry in New Zealand. Commonwealth Forestry Review, 45(3): 128-137.

HAY, D. (1872) On the Cultivation of Native Trees. Transactions of the New Zealand Institute, 5: 452-455.

HAZARD, H.D.M. (1901) Notes on the Growth of Some indigenous and other trees in New Zealand. Transactions of the New Zealand Institute, 34: 386-387.

HEAPHY, C. (1842) Narrative of a Residence in New Zealand. Smith, Elder and Co., Cornhill.

HEARN, T. J. (1982) Riparian Rights and Sludge Channels: A Water Use Conflict in New Zealand 1869-1921. New Zealand Geographer, 38(2): 47-55.

HECTOR, J. (1818) Geological Report on the River Waimakariri. Journal of the Canterbury Provincial Council, Session XXVIII (2).

HIGGINSON, H. P. (1877) On Floods in Lakes Districts and Flooded Rivers in General, with Methods adopted for their Prevention and Control. Transactions of the New Zealand Institute, 10: 180-189.

HILL, B. (1895) Denudation as a factor in geological time. Transactions of the New Zealand Institute, 28: 666-680.

HOCHSTETTER, F. (1867) New Zealand, its physical geography, geology and natural history. Cotta, Stuttgart.

HOOKER, J. D. (1853) Introductory Essay to the Flora of New Zealand. Lowell, Reese, London.

HOOKER, J. D. (1864) Handbook of the New Zealand Flora. Lovell Reeve and Co., London.

HOOKER, J. D. (1864 a) Note on the Replacement of Species in the Colonies and Elsewhere. Natural History Review, 4: 123-127.

HOOKER, J. D. (1867) On the struggle for existence amongst plants. Popular Science Review VI, 131-139.

HURTHOUSE, C. (1861) New Zealand, The Britain of the South Seas. Stanford, London, 2nd Edition.

HUTCHINS, D. E. (1916) A Discussion of Australian Forestry with special references to Forestry in Western Australia. Government Printer, Perth.

HUTCHINS, D. E. (1916a) Scientific National Forestry for New Zealand. Journal of Agriculture, 13(4): 295-317; 13(5): 375-396.

HUTCHINS, D. E. (1918) Waipoua Kauri Forest, its demarcation and management. Government Printer, Wellington.

HUTCHINS, D. E. (1918a) The Waipoua Kauri Forest. Its Demarcation and Future Management. The Journal of Agriculture, 16(3): 136-141.

HUTCHINS, D. E. (1919) New Zealand Forestry, Part 1 Kauri Forests and Forests of the North and Forest Management. Government Printer, Wellington.

HUTCHINS, D. E. (1920) Rate of Growth of Trees in Relation to Forestry. A Criticism of Mr E. Maxwell's Paper. New Zealand Journal of Science and Technology, 3(1): 1-7.

HUTCHINSON, F. E. (1926) A Forest Survey of Canterbury Part I Bound Typescript. Engineering Library, University of Canterbury.

HUTCHINSON, F. E. (1927) A Forest Survey of Canterbury Pt II Bound Typescript. Engineering Library, University of Canterbury.

HUTTON, F. W. (1871) Birds of New Zealand. Hughes, Wellington.

JEANNENEY, J. R. (1978) The Impact of World War I on French Timber Resources. The Journal of Forest History, 22(4): 226-227.

JOHNSON, R. C. (1979) Resource management in Canada's national parks, 1885-1911. The Alberton Geographer, 15: 19-35.

JOHNSTON, J. A. (1979) Image and Reality: Initial Assessments of Soil Fertility in New Zealand 1839-55. Australian Geographer, 14(3): 160-166.

JOHNSTON, J. A. (1981) The New Zealand Bush: Early Assessments of Vegetation. New Zealand Geographer, 37(1): 19-24.

JOHNSTON, R. J. (1979) Geography and Geographers. Anglo-American Human Geography Since 1945. Arrow, London.

JOHNSTON, W. B. (1961) Locating the Vegetation of Early Canterbury: A Map and its Sources. Transactions of the Royal Society of New Zealand. (Botany) 1(2): 5-15.

JOURDAIN, W. R. (1920) Digest of the land laws of New Zealand. Government Printer, Wellington.

KELLY, T. (1877) Taranaki Forest and Forest Farming. The New Zealand Country Journal, 1(4): 242-245.

KING, M. (198) The Collector. A Biography of Andreas Reischeck. Hodder and Stoughton, Auckland.

KIRK, T. (1869) On the Naturalized Plants of New Zealand, especially with regard to those occurring in the Province of Auckland. Transactions of the New Zealand Institute, 2: 131-146.

KIRK, T. (1878) On the Utilization of New Zealand Timbers. Transactions of the New Zealand Institute, 11: 458-463.

KIRK, T. (1880) On the Neglected Forest Products of New Zealand. Transactions of the New Zealand Institute, 13: 130-142.

KIRK, T. (1889) The Forest Flora of New Zealand. Government Printer, Wellington.

KIRK, T. (1895) The Displacement of Species in New Zealand. Transactions of the New Zealand Institute, 28: 1-27.

KIRK, W. (1951) Historical Geography and the concept of the behavioural environment. Indian Geographical Journal, 25: 152-160.

KIRK, W. (1963) Problems in Geography. Geography, 48(4): 357-371.

LASLETT, T. (1894) Timber and Timber Trees. Macmillan, London (1st published 1875).

LECOY, A. (1879) Forest question in New Zealand. Transactions of the New Zealand Institute, 12: 3-23.

LEWIS, N. B. (1975) A Hundred Years of State Forestry South Australia: 1875-1975. Woods and Forests Department, Adelaide, Bulletin No 22.

LEY, D. and SAMUELS, M. (1978) Humanistic Geography Prospects and Problems. Croon Helm, London.

LIBECAP, G. D. and JOHNSON, R. N. (1979) Property Rights, Nineteenth-Century Federal Timber Policy, and the Conservation Movement. Journal of Economic History, 39(1): 129-142.

LINDSAY, W. L. (1862) The Place and Power of Natural History in Colonization with special reference to Otago. YMCA, Dunedin.

LIVINGSTONE, D. N. (1980) Nature and Man in America: Nathaniel South Gate Shaler and the Conservation of natural resources. Transactions of the Institute of British Geographers, New Series 5(3): 369-382.

LOWENTHAL, D. (1961) Geography, experience and imagination: towards a Geographical epistemology. Annals of the Association of American Geographers, 51(3): 241-260.

LOWENTHAL, D. (1962) Not Every Prospect Pleases. Landscape, 12(2): 19-23.

LOWENTHAL, D. ed. (1965) Man and Nature by G. P. Marsh. Belknop Press, Cambridge Mass.

LOWRY, S. T. (1977) The Nature of Pre Industrial Forest Planning In Convery, F. J. and Ralston, C. W. eds. Forestry and Long Range Planning. School of Forestry and Environmental Studies, Duke University, Durham, North Carolina.

LUDHAM, A. (1868) On the Cultivation and Acclimatization of trees and plants. Transactions of the New Zealand Institute, 1, 1-23.

LULL, H. W. (1949) Forest Influences: growth of a Concept. Journal of Forestry, 47(9): 700-705.

MAINWARING, E. (1965) Italian Landscape in Eighteen Century England. Cass, London (1st published 1925).

MALING, P. (1958) The Torlesse Papers. Pegasus, Christchurch.

MANTEL, K. (1964) Whats happening in Forest History Research, Writing, Collecting. Forest History Newsletter, 8: 16.

MARSH, C. P. (1864) Man and Nature. Reprinted 1965, Belknap Press, Cambridge, Mass. edited by D. Lowenthal.

MASTERS, S. E., HOLLOWAY, J. T. and McKELVEY, P. J. (1957) The National Forest Survey of New Zealand 1955. Government Printer, Wellington.

MATHER, A. S. (1982) The Changing Perception of Soil Erosion in New Zealand. The Geographical Journal, 148(2): 207-213.

MATTHEWS, H. J. (1905) Tree-Culture in New Zealand. Government Printer, Wellington.

MAXWELL, E. (1919) Rate of Growth of Indigenous and Exotic Trees in New Zealand. The New Zealand Journal of Science and Technology, 2(6): 371-376.

MAXWELL, E. (1930) Afforestation in Southern Lands. Whitcombe and Tombs, Auckland.

MEINIG, D. W. (1954) The Evolution and Understanding of an Environment: Climate and Wheat Culture in the Columbia Plateau. Yearbook of the Association of Pacific Coast Geographers, 16: 25-34.

MEINIG, D. W. (1962) On the Margins of the Good Earth. Rand McNally, Chicago.

MONK, R. (1886) Our Forests and How to Conserve Them: A Paper on the New Zealand State Forests Act, 1885. Star Office, Auckland.

MORAN, F. A. (1979) The Role of the Government in the development of the New Zealand Tourist Industry 1901-1979. M.A. Thesis, University of Canterbury, Christchurch.

MORGAN, W. (1886) State Forests. The New Zealand Country Journal, 10(2): 119-123.

MOORE, L. B. and EDGAR, E. (1970) Flora of New Zealand Volume II. Government Printer, Wellington.

MUNRO, D. (1869) On the leading features of the Geographical Botany of the provinces of Nelson, and Marlborough, New Zealand. Transactions of the New Zealand Institute, 1: 161-174.

MURPHY, M. (1901) Discussion of Papers. Conference of the New Zealand Fruitgrowers and Horticulturalists, Dunedin, pp 112-115.

MURTON, B. J. (1968) Mapping the Immediate Pre-European Vegetation on the East Coast of the North Island of New Zealand. Professional Geographer, 20(4): 262-264.

McARTHUR, D. (1882) On the Importance of Forests. Transactions of the New Zealand Institute, 15: 461-463.

McCASKILL, L. W. (1973) Hold this Land. A History of Soil Conservation in New Zealand. Reed, Wellington.

McCASKILL, M. (1960) Historical Geography of Westland Before 1914. Ph.D. Thesis University of Canterbury, Christchurch.

McDONELL, J. C. (1929) Early Days of Forestry in India. Empire Forestry Journal, 8(1): 85-97.

McGREGOR, W. R. (1930) Waipoua. Wanderlust Magazine, 1(3): 49-68.

McGREGOR, W. R. (1930a) From Fern to Forest. The Life History of Waipoua. Wanderlust Magazine, 1(5): 1-25.

McGREGOR, W. R. (1948) The Waipoua Kauri Forest of Northern New Zealand. Privately Published, Auckland.

McINTOSH, C. B. (1975) Use and Abuse of the Timber Culture Act. Annals of the Association of American Geographers, 65(3): 347-362.

McINTYRE, W. D. (1980) Salvaging the Canterbury Plan: Henry Sewell and the Founding of Canterbury. In Richardson, L. and McIntyre, W. D. eds Provincial Perspectives. Essays In honour of W. J. Gardner. University of Canterbury, Christchurch.

McKINNON, A. D. (1957) Working Plans in New Zealand. New Zealand Forest Service Technical Paper No 18.

McNAB, R. (1903) Forestry and its Relation to the farmer. Southern Standard, Gore.

NASH, R. (1967) Wilderness and the American Mind. Yale University Press, New Haven.

NICHOLSON, M. H. (1959) Mountain Gloom and Mountain Glory. Cornall University Press, New York.

O'CONNOR, K. (1976) The Condition of the Mountains. Sixteenth Annual Report of the Tussock Grasslands & Mountainlands Institute, Lincoln, pp 8-13.

OLIVER, W. H. (1960) The Story of New Zealand. Faber, London.

OLWIG, K. R. (1980) Historical Geography and the Society/Nature "problematic": 'the perspective of J. F. Schouw, G. P. Marsh and E. Reclus. Journal of Historical Geography, 6(1): 29-45.

O'RIORDAN, T. (1971) Perspectives on Resource Management. Pion, London.

O'RIORDAN, T. (1979) Public Interest Environmental Groups in the United States and Britain. Journal of American Studies, 13(3): 409-438.

OLSON, S. (1971) The Depletion Myth. Harvard University Press, Cambridge Mass.

PACKARD, J. J. (1978) Sir Robert Seppings and the Timber Problem. The Mariners Mirror, 64(2): 145-156.

PEARS, N. V. (1982) Familiar Aliens: The Acclimatisation Societies' Role in New Zealand's Biogeography. Scottish Geographical Magazine, 98(1): 23-34.

PEPPERCORNE, F. S. (1879) On the Influence of Forests on Climate and Rainfall. Transactions of the New Zealand Institute, 12: 24-32.

PERREE, W. F. (1927) Indian Forest Administration. Empire Forestry Journal, 6(2): 275-288.

PETERSEN, G. (1959) Pioneering the New Zealand Bush. New Zealand Geographical Society Record, 27: 5-8.

PETERSEN, G. C. (1965) Pioneering the North Island Bush In Watters, R. F. Land and Society in New Zealand. Reed, Wellington. pp 66-79.

PETRIE, L. M. (1963) From Bush to Cooksfoot. An Essay on the destruction of Banks Peninsula's Forests. M. Sc. Thesis University of Canterbury, Christchurch.

PINCHOT, G. (1937) How Conservation Began in the United States. Agricultural History, 11(4): 255-265.

POOLE, A. L. (1969) Forestry in New Zealand. The Shaping of Policy. Hodder & Stoughton, Auckland in association with English Universities Press, London.

POTTS, T. H. (1878) Through a Young Plantation. The New Zealand Country Journal, 2(6): 390-397, 3(1): 34-38.

POTTS, T. H. (1882) Out in the Open. Lyttelton Times, Christchurch.

POTTS, T. H. (1886) Out in the Open. The New Zealand Country Journal, 10(3): 173-185.

POTTS, T. H. & GRAY, W. (1870) On the Cultivation of Some Species of Native Trees and Shrubs. Transactions of the New Zealand Institute, 3: 181-202.

POWELL, J. M. (1970) The Public Lands of Australia Felix. Melbourne, Oxford University Press.

POWELL, J. M. (1976) Environmental Management in Australia 1788-1914. Oxford University Press, Melbourne.

POWELL, J. M. (1978) Mirrors of the New World. Images and Image makers in the settlement process. Dawson, Folkeston, Kent.

POWELL, J. W. (1888) Forests and Arid Lands. Proceedings of the Royal Geographical Society, 10: 793-794.

PRACY, L. T. (1974) Introduction and Liberation of the Opossum (Trichosurus vulpecula) into New Zealand. Wellington. New Zealand Forest Service. Information Series No 45. (1st published 1962).

RAKESTRAW, L. (1972) Conservation historiography: An Assessment. Pacific Historical Review, 41(3): 271-288.

RAKESTRAW, L. (1979) Forest History in Alaska: Four Approaches to two Forest Ecosystems. Journal of Forest History, 23(2): 60-71.

RAUP, H. M. (1964) Some Problems in Ecological Theory and their relation to conservation. Journal of Ecology 52, Supplement, 19-28.

REEVES, W. P. (1898) The Long White Cloud. Fourth edition reprinted by Golden Press, Auckland 1980.

REISCHEK, A. (1885) Observations on the habits of New Zealand birds, their Usefulness or Destructiveness to the Country. Transactions of the New Zealand Institute, 18: 96-104.

RELPH, E. (1970) An Inquiry into the relations between phenomenology and geography. The Canadian Geographer, 14(3): 193-201.

RICHARDSON, J. (1891) On the Extinction of Native Birds on the West Coast. Transactions of the New Zealand Institute, 24: 713.

ROCHE, M. M. (1979) The Origins and Evolution of Scenic Reserves. M.A. thesis, University of Canterbury, Christchurch.

ROCHE, M. M. (1981) Securing Representative Areas of New Zealand's Environment: Some Historical and Design Perspectives. New Zealand Geographer, 37(2): 73-78.

RUTLAND, J. (1900) Regrowth of the Totara. Transactions of the New Zealand Institute, 33: 324-327.

SAUER, C. O. (1941) Foreward to Historical Geography. Annals of the Association of American Geographers, 31(1): 1-24.

SAUER, C. O. (1981) Selected Essays 1963-1975. Turtle Island Foundation, Berkeley.

SCHLICH, W. (1896) Schlich's Manual of Forestry. Bradbury, Agnew and Co., London. 5 Volumes, 2nd Edition.

SCHLICH, W. (1918) Forestry in the Dominion of New Zealand. The New Zealand Journal of Science and Technology, 1(4): 201-210.

SCHOLEFIELD, G. H. (1924) Who's Who in New Zealand. Masterton, New Zealand. (2nd Edition).

SCHOLEFIELD, G. H. and SCHWARE, E. (1908) Who's Who in New Zealand. Gordon and Gotch, Wellington.

SEARS, P. B. (1956) The Importance of Forests to Man In Haden-Guest, S., Wright, J. K. and Telclaff, E. M. eds. A World Geography of Forest Resources. Ronald Press, New York pp 3-12.

SHEAIL, J. (1974) Nature in trust, the history of nature conservation in Britain. Blackie, Bishopbriggs, Glasgow.

SHEPARD, P. (1969) English Reaction to the New Zealand Landscape before 1850. Pacific Viewpoint Monograph No 4.

SIMPSON, T. E. (1973) Kauri To Radiata, Origin and Expansion of the Timber Industry in New Zealand. Hodder and Stoughton, Auckland.

SINCLAIR, K. (1974) A history of New Zealand. Penguin, Harmondsworth (1st published 1959).

SKINNER, W. H. (1946) Reminiscences of a Taranaki Surveyor. Avery, New Plymouth.

SMITH, C. M. (1957) Changed and Changing Vegetation. In Callaghan, F. R. ed Science in New Zealand. Reed, Wellington, pp 123-136.

STATE FOREST SERVICE (1923) Forests and Forestry in New Zealand. Prepared for the Imperial Forestry Conference, Ottawa, 1923.

STEWART, J. (1905) Notes on the Growth of Certain Native Trees in the Auckland Domain. Transactions of the New Zealand Institute, 38: 374-377.

STEWART, W. D. (1937) Sir Francis Dillon Bell. Butterworth, Wellington.

STOKES, E. (1966) Kauri and White Pine: A Comparison of New Zealand and American Lumbering. Annals of the Association Geographers, 56(3): 440-450.

STONE, R. C. (1973) Makers of Fortune. A colonial business community and its fall. Auckland University Press, Oxford University Press.

TAYLOR, P. H. (1950) The History of the Kauri Timber Industry. M.A. Thesis University of Auckland, Auckland.

THOMAS, A. P. (1891) The preservation of the native fauna and flora of New Zealand. New Zealand Journal of Science, 2(1): 93.

THOMSON, A. P. (1952) Problems of Sustained-Yield Management in New Zealand Forestry. British Commonwealth Forestry Conference, Canada.

THOMSON, G. M. (1901) The Stability of the Native Flora: A Plea for its Preservation. Conference of New Zealand Fruit-growers and Horticulturalists, Dunedin pp 103-107.

TRAVERS, W. T. (1869) Remarks on a comparison of the general features on the Flora of the provinces of Nelson and Marlborough with that of Canterbury. Transactions of the New Zealand Institute, 1: 174-179.

TRAVERS, W. T. (1870) On the Changes effected in the natural features of a new country by the introduction of civilized races. Transactions of the New Zealand Institute, 3: 326-336.

TRAVERS, W. T. (1881) Notes upon the great floods of February, 1868. Transactions of the New Zealand Institute, 14: 76-89.

TROUP, R. S. (1940) Colonial Forest Administration. Oxford University Press, London.

TUAN, Y. F. (1974) Topophilia. A study of Environment Perception, Attitudes, and Values. Prentice Hill, Englewood Cliffs, N.J.

TUAN, Y. F. (1979) Landscapes of Fear. Blackwell, Oxford.

TUAN, Y. F. (1979) Space and Place. The Perspective of experience. Edward Arnold, London.

VEBLEN, T. T. (1978) Forest Preservation in the Western Highlands of Guatemala. Geographical Review, 68(4): 417-434.

WALSH, P. (1892) The effect of deer on the New Zealand bush: a plea for the protection of our forest reserves. Transactions of the New Zealand Institute, 25: 435-439.

WALSH, P. (1898) On the Future of the New Zealand Bush. Transactions of the New Zealand Institute, 31: 471-482.

WALSH, P. (1910) The Effects of the Disappearance of the New Zealand Bush. Transactions of the New Zealand Institute, 43: 436-447.

WARDS, I. ed (1976) New Zealand Atlas. Government Printer, Wellington.

WARD, W. C. (1967) Fifty Years ... A History. Dominion Sawmillers' Federation Incorporated.

WARDELL, R. (1889) Some social responsibilities of a young colony. Zealandia, 1(1): 17-20.

WESTON, G. C. (1957) Exotic Forest Trees in New Zealand. New Zealand Forest Service, Wellington. Bulletin No 13.

WILD, L. J. (1963) The Life and Times of Sir James Wilson of Bulls. Whitcomb and Tombs, Christchurch.

WILLIAMS, D. M. (1966) Merchanting in the first half of the nineteenth century: the Liverpool timber trade. Business history, 8: 103-121.

WILLIAMS, M. (1974) The Making of the South Australian Landscape. Academic Press, London.

WILLIAMS, M. (1982) Clearing the United States Forests: pivotal years 1810-1860. Journal of Historical Geography, 8(1): 12-28.

WINTERS, R. K. (1975) Forestry Beginnings in India. Journal of Forest History, 19(2): 83-90.

WOJEIKOF, A. (1871) The Results of the destruction of forests upon the River Wolga at Astralan. Transactions of the New Zealand Institute, 4: 374-376.

WOOLSEY, (1920) Studies in French Forestry. Chapman and Hall, London.

WRIGHT, J. K. (1947) Terrae incognitae: the place of imagination in Geography. Annals of the Association of American Geographers, 37(1): 1-15.

WRIGHT, J. K. (1966) Human Nature in Geography. Harvard University Press, Cambridge, Mass.

WYNN, G. (1977) Administration in Adversity: The Deputy Surveyors and Control of the New Brunswick Crown Forests Before 1844. Acadiensis, 7(1): 49-65.

WYNN, G. (1977a) Conservation and Society in Nineteenth Century New Zealand. New Zealand Journal of History, 11(2): 124-136.

WYNN, G. (1977b) Discovering the antipodes. A review of historical geography in Australia and New Zealand, 1969-1975 with a bibliography. Journal of Historical Geography, 3(3): 251-265.

WYNN, G. (1979) Pioneers, politicians and the conservation of forests in New Zealand. Journal of Historical Geography, 5(2): 171-188.

WYNN, G. (1980) "Deplorably Dark and Demoralized Lumberers"? Rhetoric and Reality in Early Nineteenth Century New Brunswick. Journal of Forest History, 24(4): 168-187.

WYNN, G. (1981) Timber Colony. A historical geography of early nineteenth century New Brunswick. University of Toronto Press, Toronto.

ZON, R. (1941) Climate and the nation's forests. U.S. Department of Agriculture. Year Book for Agriculture pp 477-498, Washington.